

Julius Rosenberg Et AL.

Referral

National

Aeronautics

And Space

Administration

No. 16

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appeal to:

Mr. Miles Wagoner

Freedom of Information Officer

National Aeronautics and Space Administration

Washington, DC 20546

Packet 16

REFERRAL

Reviewed by:

*[Signature]*

AGENCY National Aeronautics and Space Administration

No. of Pages

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Subject and File Number

Serial

Date

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SAC, San Francisco

Director, FBI

February 19, 1952

WILLIAM PERL, aka

ESPIONAGE - R

PERJURY

(65-59312)

100-31418

Re Cleveland let January 21, 1952, in the above-captioned matter wherein it was suggested that the Bureau may desire to have Robert T. Jones and his wife, Doris Jones, interviewed concerning their relationship with Perl, and the facts concerning the disappearance of the report on guided missiles from Langley Field Laboratory during November, 1944. (U)

It was pointed out in Bulet of January 26, 1952, Mr. Robert L. Bell, Security Officer of the National Advisory Committee for Aeronautics (NACA), has expressed the opinion that Jones, who was considered an authority on the JB-2 (also known as the MX-544) guided missile, was primarily interested in the stability features of that missile. It was further mentioned by Bell that Jones, having had access to all of the exact details with respect to the JB-2, would have been in the position to have furnished accurate details and dimensions concerning any of the features of this project. (U)

Bell recently made available to the Bureau copies of various attached memoranda submitted by Jones setting forth his itinerary and making his reports to NACA in connection with the JB-2 project. With respect to Jones' trip to Cleveland, Ohio, on August 24, 1944, it is noted from the itinerary that no information is set forth in this report or is presently available at NACA which indicates the exact length of time Jones remained in Cleveland, or the identity of any of his contacts there, other than his proposed visit to Jack and Helms Company, a subcontractor on the JB-2 project. It is possible that additional information concerning this trip may be developed by the Washington Field Division at the time Jones' expense vouchers are secured from the General Accounting Office in Washington, D. C. (U)

A check of Bufiles as to Robert T. Jones and Doris Jones failed to reflect any identifiable subversive information other than that which was previously set forth in Bulet of November 21, 1951. The San Francisco Office (U)

Enclosures

cc: SAC, New York (Enclosure) (65-14843)

(65-16387)

SAC, Cleveland (65-2151) (65-2730)

SAC, Washington Field (65-5616) (65-3546)

EE:ml

(121-10445)

Note on page



Accordingly, authorized to interview Robert and Doris Jones for full information concerning their association with and knowledge of the activities of an Perl. These interviews should be handled simultaneously but separately, and should be given early attention unless information appears in files of your office which would make such interviews undesirable at the present time. (11)

During the course of your interview with Robert L. Jones, he should be specifically interrogated concerning his participation in the NB-2 guided missile project during the years 1944 and 1946. The extent of his travels in connection with this project, and particularly the details of his visit to Cleveland on or about August 24, 1944, should be ascertained. With respect to the latter, it should be determined whether he contacted William Perl or any other persons in Cleveland in addition to his official visit at the Jack and Jints Company, the length of time he remained in Cleveland and whether he thereafter returned to Wright Field or Langley Field. You should question him to whether he ever made the acquaintance of Andrei M. Schevchenko during his 1944 period and, if so, the circumstances of their meeting and association should be developed. He should be specifically interrogated as to whether at any time discussed the details of the jet motor unit or the launching mechanism for the production plans with the NB-2 with Perl, Schevchenko, or any other person during the period of his visit to Cleveland during the latter part of August or the early part of September, 1944. To assist you in your interrogation of Jones, there are being transmitted herewith for your information Photostats of the following reports concerning Jones which were made available to the Bureau by MACA: (11)

Memorandum from Mr. Carlton Kemper to MACA Headquarters dated September 29, 1944, with the attachment entitled "Progress Report on Ram-Jet and Aero-Pulse Projects." (11)

Memorandum from Mr. Charles F. Barnett to MACA Headquarters dated October 25, 1951, together with the attachments to that memorandum designated as numbers 4, 5, and 10. (11)

Memorandum from Mr. H. Burton Bracy to MACA Headquarters dated November 15, 1951. (11)

**Note:**

Check of files reflects the following concerning Robert Thomas and Doris Lenore Jones. Robert Thomas Jones was born in Macon, Missouri, May 28, 1910, attended University of Missouri 1928 to 1929, and Catholic University, Washington, D. C. 1931 through 1933. Employed Langley Memorial Laboratory of NACA on October 30, 1944. Now employed at Ames Laboratory of NACA, California. His wife Doris Lenore Jones, nee Cohen, was born NYC on October 2, 1915. They resided at 840 Lincoln, Palo Alto, California. According to the LGE files, both Jones and his wife were considered liberals while at Langley Field, Virginia. Jones was President of the American Association of Scientific Workers there, which organization meets allegedly following Communist Party line and some of whose members were known associates of Communists. Jones was President of FAECT Local #15 at Langley Field in 1944, which organization reported to have been Communist infiltrated. No information indicating Jones or wife engaged in espionage and both were found eligible for employment on loyalty. (U)

TOP SECRET

SAC, New York (65-15387)

Director, FBI (65-59312)

~~TOP SECRET~~

June 2, 1952

WILLIAM PERL, aka  
ESPIONAGE - R

PERSONAL ATTENTION

~~CONFIDENTIAL~~

Classified by 5886 3/14/78  
Exempt from GDS, Category 2  
Date of Declassification Indefinite

[REDACTED] b1

On the basis of this information, the Bureau has made an inquiry of Mr. Robert L. Bell, Security Officer, National Advisory Committee for Aeronautics (NACA), Washington, D. C., and he advised after research that there was no information available that any guided missiles were actually produced during 1944 which were equipped with I-16 engines. You will recall, however, that the Bureau had previously determined in connection with the investigation concerning the XP-81 fighter plane that the I-16 engine is a Whittle type turbojet engine which was manufactured by the General Electric Company. (u)

Mr. Bell advised that in making his research concerning this matter he located some information which he considered might be of significance in connection with instant case. He stated that according to the files, NACA received a letter dated August 4, 1944, from the Air Materiel Command at Wright-Patterson Air Force Base, Dayton, Ohio, requesting that a program be undertaken for the purpose of developing a pilotless guided missile to meet the following requirements:

APPROPRIATE AGENCIES	Range	400 miles
AND FIELD OFFICES	Payload	4000 demolition bomb
ADVISED BY ROUTING	Speed	550 MPH plus
SLIP(S) OF	Control	Remote or target seeking

(u)

DATE 6-1-52 According to this letter, NACA was given the responsibility of participating in the vehicle (missile or airframe) and the power supply (motor). (u)

The records of NACA reflected that by letter dated August 16, 1944, the Lewis Flight Propulsion Laboratory of NACA at Cleveland, Ohio, was furnished a copy of the Air Materiel Command's request and (u)

Enclosure

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cc: 2 - Cincinnati (65-1744) JUN 8 1952  
2 - Cleveland (65-2730) (with enclosure)  
2 - Los Angeles (65-5075) EX-113  
2 - San Francisco  
2 - Washington Field (65-5543)

EFB:GAS

JUN 7 1952

COMM - FBI

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was authorized to start work on this secret project which was to be designated as NACA #E-110. It was pointed out that the project was considered as a long-range planning project to supersede the JB-2 guided missile. A review of the file on project #E-110 indicated that by letter dated February 23, 1944, the Lewis Flight Propulsion Laboratory sent into NACA headquarters five copies of a secret report entitled "Preliminary Analysis for the Army Air Forces, Air Technical Command, Design Study of High-Speed Long-Range Guided Missiles." This report was dated September 20, 1944, and the authors thereof appeared thereon as William Mutterperl and Alan D. Johnson, (u) aeronautical engineers.

A Photostat of this report which was originally under a secret classification but was declassified to confidential on May 5, 1952, was made available to the Bureau, and a Photostat thereof is herewith being furnished to the New York and Cleveland Offices for their assistance and information in this matter. It is noted that as a result of the research as reflected in this report, a recommendation was made that a single over-speeded General Electric I-16 (Whittle) (u) jet engine should be used on such guided missile as being most satisfactory for the purpose desired.

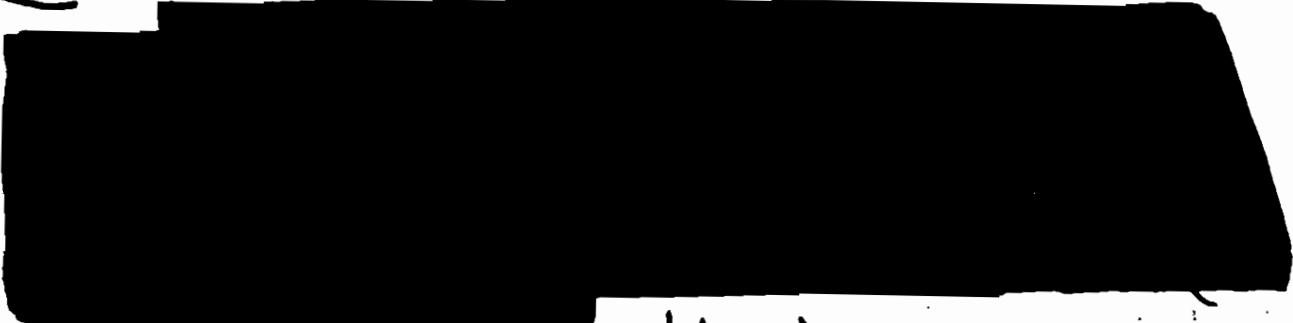
According to instant NACA file, this report being classified as secret was reviewed only by top officials of NACA in Washington, D. C., and was thereafter o.k.'d by them for release to the Army on September 26, 1944. It appeared from this file that ten copies of this report were made available to the Army Air Forces liaison officer at the Lewis Flight Propulsion Laboratory in Cleveland, Ohio, four copies on September 26, 1944, five copies on November 17, 1944, and one copy on January 24, 1945. There was no indication of any other dissemination made of this report outside of NACA. (u)

Mr. Bell advised that he had telephonically contacted Mr. H. Burton Bracey, the NACA security officer at Lewis Flight Propulsion Laboratory, and had learned that there was in existence no record indicating the exact number of copies of instant report which were originally made, and therefore, it could not be determined whether any copy or copies might be missing from their files. It was explained, however, that under normal circumstances an engineer participating in such project might retain for his own use and reference either his own notes or a copy of his report covering the research. (u)

It is noted with respect to this report which bears the written signatures of subject Perl that the Bureau's previous efforts to impute knowledge concerning the JB-2 project to subject Perl have been unsuccessful. However, from a review of instant report which was prepared by Perl it would definitely appear that he must have been in possession of certain of the details relative to the JB-2 in view of his having made reference therein to the fact that consideration was given to the German robot bomb. As you will recall, the JB-2 was patterned after the German V-1 robot bomb. (U)

It is also noted that during the period of Perl's research in connection with instant guided missile project, he is known to have been visited in Cleveland by Robert T. Jones, an NACA engineer who was especially assigned to the research of the JB-2 bomb. In view thereof, it is entirely possible that Perl may have had a conference with Jones during the latter's visit to the Lewis Flight Propulsion Laboratory around the first of September 1944, at which time there was a discussion as to the details of the JB-2 project. (U)

Mr. Bell stated that he had requested Mr. Bracey to make a thorough search of all the records available at Lewis Flight Propulsion Laboratory for any additional pertinent information concerning Perl's participation in instant guided missile project in order to determine the exact dates when Perl performed his research in this matter as well as the identity of classified material to which he may have had access during the research. Further, Mr. Bracey was to make an effort to locate any information appearing in the files of that laboratory which might reflect that Perl had access to data pertaining to the JB-2 project or attended any conferences at the Lewis Flight Propulsion Laboratory with Jones or any other engineers or officials wherein the production of the JB-2 guided missile was discussed. Mr. Bell indicated that he had instructed Mr. Bracey to forward any such pertinent material to NACA headquarters in Washington, D. C. (U)



b1



[REDACTED]

For the information of the Cleveland Office, a check of Bufiles has failed to reflect any identifiable derogatory information pertaining to Alan D. Johnson, the co-author of instant preliminary analysis report. Accordingly, you are authorized to conduct an appropriate interview with Johnson, an aeronautical engineer at the Lewis Laboratory unless information might appear in the files of your office which would make such interview inadvisable at the present time. (U)

During this interview you should bear in mind that Johnson may be in a position to furnish information as to the exact dates of participation by Perl in this project; the identity of any classified documents or reports, including those pertaining to the JB-2, to which Perl had access during his research; the conferences which Perl may have had with Jones or any other person relative to the JB-2; the number of copies of instant preliminary analysis research report which were originally made; the number of copies of the report, if any, that Perl may have retained in his possession; and any trips which he recalls Perl may have made during or immediately subsequent to instant research report. (U)

According to NACA, more positive information as to the use or contemplated use of the I-16 engine for guided missiles during the year 1944 could best be obtained by a further inquiry at the Wright-Patterson Air Force Base in Dayton, Ohio. The Cincinnati Office is therefore requested to make an appropriate inquiry through the Air Materiel Command at that base for any additional information of possible pertinence to this matter. (U)

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It is understood through information made available by NACA that the JB-1 guided missile was originally designed for the use of the I-16 jet engine, but this missile was dropped and a similar missile redesignated as the JB-10, which used a pulse jet engine, was substituted. It is requested that the Cincinnati Office obtain full information concerning the JB-1 including such data as to exact dates, identity of reports or research memoranda prepared, names of companies participating therein, and the ultimate stage of its development or production when the project was dropped. (U)

The Cincinnati Office should likewise obtain full information as to the ten copies of instant preliminary analysis report concerning high-speed, long-range guided missiles, including such data as to whether the copies were numbered, to whom the various copies were disseminated, and the ultimate disposition of any copies retained at the base. (U)

It is desired that this investigation be given immediate attention. (U)

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**NATIONAL ADVISORY COMMITTEE  
FOR AERONAUTICS**

1724 F STREET, NORTHWEST  
WASHINGTON 25, D. C.

LANGLEY AERONAUTICAL LABORATORY  
LANGLEY FIELD, VA.

AMPS AERONAUTICAL LABORATORY  
MOFFETT FIELD, CALIF.

LEWIS FLIGHT PROPULSION LABORATORY  
2100 BROADWAY BINA, CLEVELAND 11, OHIO

May 7, 1952

TELEPHONE: LIBERTY 5-6700

Director  
Federal Bureau of Investigation  
U. S. Department of Justice  
Washington 25, D. C.

Re: William Perl w.a.  
William Mutterperl  
Espionage R  
Perjury

Dear Sir:

As of possible interest to you in the above-captioned case, I am enclosing a photostatic copy of a preliminary analysis report entitled "Design Study of High-Speed Long-Range Guided Missile" by William Mutterperl.

This report was originally issued as Secret but recently has been downgraded to Confidential. The dissemination by NACA of this report was quite limited.

It will be noted that this study contemplated the use of the General Electric I-16 turbojet engine. I am able to locate only one other missile which, as of 1944, was designed for that engine; that missile was the JB-1. It appears that the JB-1 missile project was dropped and a similar missile redesignated the JB-10 and using a pulse jet engine was substituted. The availability of I-16 engines may have had some bearing on this decision.

However, authoritative information on the use or contemplated use of the I-16 engine for missiles as of 1944 could best be obtained from the Wright-Patterson Air Force Base at Dayton, Ohio.

Very truly yours,

Robert L. Bell  
Security Officer

Enclosure

65-59312-704

RECORDED-101  
INDEXED-101

MAY 10 1952



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Security Information

NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

PRELIMINARY ANALYSIS

Army Air Forces, Air Technical Service Command

DESIGN STUDY OF HIGH-SPEED LONG-RANGE GUIDED MISSILE

Aircraft Engine Research Laboratory  
Cleveland, Ohio

September 20, 1944

SUMMARY

At the request of the Army Air Forces, a design study has been made of a guided missile to carry a two-ton bomb load a distance of 400 miles or more at a speed of 550 miles per hour. Several types of power plant were first analyzed to ascertain their suitability for this task. These included a 2000 horse-power conventional engine, the General Electric I-16 (Whittle) jet engine, and the German robot bomb (aeropulse) jet unit in multiples of two and four. A single overspeeded General Electric I-16 unit was found to be most satisfactory. A layout and design study of a guided missile incorporating this power plant was made.

INTRODUCTION

The Army Air Forces asked the NACA for a design study of a high-speed, long-range guided flying missile. The specifications were as follows:

Speed: 550 miles per hour

Range: 400 miles or more

Bomb load: 4000 pounds

Power plant: one which is available for immediate mass production and which is not too costly in view of the expendable nature of the missile.

Missile design: sufficiently simple and straightforward so that construction may be started immediately without the necessity for a development program.

In order to choose a suitable power plant, a preliminary analysis was made of the performance of a guided missile driven by different types of power plant satisfying the specifications. A more detailed performance analysis was made of the power plant that the preliminary analysis indicated to be most satisfactory.

CLASSIFICATION CHANGED TO  
*Confidential*

BY AUTHORITY OF A. H. ...  
DATE 2-5-52

DATE 5-5-52

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where

- $F_j$  jet thrust (function of engine speed, ram pressure and temperature at speed  $V$  from reference 1), lb
- $M$  gas flow, a function of engine speed, ram pressure, and temperature at speed  $V$  from reference 1, slugs per second
- $\rho$  air mass density, slugs per cubic foot
- $S$  wing area, square feet,
- $A$  wing aspect ratio, 4.5
- $C_{Dp}$  profile-drag coefficient, taken as 0.018
- $W$  total weight of missile, taken as 9800 pounds
- $e$  airplane efficiency factor, taken as 0.75

With the aid of the data of reference 1, equation (1) was solved for the engine speed to give a speed  $V$  of 550 miles per hour at sea level. The resulting engine speed of 16,900 rpm was subsequently used in the detailed performance analysis. The jet thrust  $F_j$  at this engine speed and at the ram ratio 1.3, corresponding to a missile speed of 550 miles per hour and an inlet diffuser efficiency of 80 per cent, was about 2570 pounds, as indicated in table I. The net thrust  $F_j - M \cdot V$  is 1500 pounds. The specific fuel consumption of 1.16 pounds per thrust horsepower-hour is about the same as that of the conventional engine. The thrust horsepower output is considerably higher however: 2200 horsepower as compared with 1500 horsepower for the conventional engine. The frontal area of the I-16 unit is about the same as that of the R-1830 or V-1710 engines.

The net thrust of the German aeropulse unit installed in the guided missile was estimated on the basis of Wright Field test data to be about 600 pounds. Two units, which have about the same over-all diameter in combination as the I-16 unit or the R-1830 engine, would therefore yield about the same thrust horsepower and high speed as the R-1830 engine. (See table I.) Four aeropulse units give a calculated high speed of 614 miles per hour. The high fuel weight of such an installation would, however, make the launching problem relatively difficult, as indicated by the take-off speeds in table I. Much of the advantage of the aeropulse unit over other power plants; namely, low cost and ease of manufacture, may be lost when four such units are compared with one I-16 unit.

As regards extension of range above 400 miles, the I-16 and conventional engine installations are most advantageous because of their higher over-all efficiencies and consequent lower additional required fuel load. It should be noted that, if

Finally a preliminary layout of the component parts of the missile was made to check balance, stability, and the general arrangement of the missile.

The choice of power plant, the performance analysis, and the missile arrangement are discussed in the following sections.

### CHOICE OF POWER PLANT

The following power plants were considered in the design study:

- (1) Pratt & Whitney R-1830 air-cooled engine or an Allison V-1710 liquid-cooled engine
- (2) The General Electric I-16 (Whittle) jet-propulsion engine
- (3) The German robot bomb, or aeropulse, jet unit in combinations of two and four units

The Westinghouse jet-propulsion unit was not considered because a single unit could not develop sufficient thrust and two units tended to complicate the design excessively. Steady flow ram jets were not considered because no experimental data are available on their performance and too long a research program would be needed to provide such data. The theory of such jets together with reasonable assumptions of duct losses indicated too low efficiencies at the speeds contemplated. Similarly rockets were discarded because of too low an over-all efficiency. Low over-all efficiency results in excessive size and weight of the missile and greatly increases the problem of launching.

The calculated performance of the guided missile with each of the power plants studied is given in table I. On the basis of a wing area of 100 square feet the over-all profile-drag coefficient of the missile was assumed to be 0.018. Special care in construction may be required to achieve this drag coefficient.

In the calculations of the performance with the conventional engine installation it was estimated that the power rating of the R-1830 and V-1710 engines, with water injection, could be extended to 2000 brake horsepower for 1 hour of operation. Assuming a propeller efficiency of 75 percent, the useful thrust horsepower of the engine is 1500. The resulting calculated high speed of the missile at sea level is 469 miles per hour.

The General Electric I-16 unit, when overspeeded to 16,900 rpm (rated speed 15,500 rpm) gave a high speed at sea level of 550 miles per hour. The high speed  $V$  is given by

$$F_j - M_g V - \frac{1}{2} \rho S C_D V^2 - \frac{W^2}{\pi \rho S A_e V^2} = 0 \quad (1)$$

the over-all efficiency of the aeropulse unit can be sufficiently improved to compare with that of the I-16 unit, it would probably be the most satisfactory power plant for the guided missile application.

It was concluded from the preliminary analysis that one General Electric I-16 jet engine, operated overspeed at about 16,800 rpm, complied most satisfactorily with the specifications for the missile.

## PERFORMANCE ANALYSIS

A more detailed analysis was next made of the performance of a guided missile equipped with a General Electric I-16 engine, for altitudes of 0, 10,000, and 20,000 feet and for fuel loads corresponding to ranges of approximately 400 and 1000 miles. The results are given in table II.

The high speeds  $V$  were calculated by equation (1). The missile weight  $W$  used was that appropriate to the altitude considered, account being taken of the consumption of fuel during the climb to altitude. The fuel consumption and range during climb were determined by the best (maximum) rate of climb  $u_c$  and the flight speed  $V_c$  for best rate of climb. These values were determined from the rate of climb equation (2) by the condition

$$\frac{du_c}{dV_c} = \frac{P_j + V_c \frac{dP_j}{dV_c} - 2Wg - V_c^2 \frac{dW}{dV_c} - \frac{3}{2} \rho S C_D V_c^2 + \frac{W^2}{2 \rho S A e V_c^2} = 0$$

The range at altitude was calculated as the sum of the distance covered in the climb and the distance at the altitude required to consume the fuel. Any additional distance traversed by means of a power-off maneuver at the end of the flight was ignored. The range for a given fuel load is seen to increase with altitude at the rate of approximately 110 miles per 10,000 feet at the lower range and 275 miles per 10,000 feet at the higher range. This increase of range is a consequence of the reduced fuel consumption with altitude for a given engine speed and of the fact that the high speed increases with altitude. The maximum rate of climb at the lower fuel load decreases approximately linearly from 2140 feet per minute at sea level to 875 feet per minute at 20,000 feet. At the higher fuel load

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the maximum rate of climb decreases from 1210 feet per minute at sea level to 136 feet per minute at 20,000 feet. The ceilings are 28,600 feet and 22,600 feet, respectively. For the two missile weights.

### MISSILE ARRANGEMENT

The best arrangement of control equipment, explosive, fuel, and engine on the basis of purpose of the missile, stability, power-plant performance, and ease of manufacture was found to be the one shown in figure 1. This layout is for the missile with a 400-mile range; the missile of 1000-mile range would have a longer fuselage.

### Wing

Take-off was assumed to be assisted and a maximum take-off speed of 200 miles per hour was selected. With an estimated gross weight of 10,000 pounds and a wing loading of about 100 pounds per square foot, the resulting wing area was 100 square feet. Using this value the minimum flying speed at  $C_L = 1.1$  was 186 miles per hour.

An NACA low-drag wing section was selected because of the high critical speed required. The sections chosen were:

- Root: NACA 65, 2 - 212
- Tip: NACA 65, 2 - 209

A slight spanwise taper was provided for structural considerations and the taper due to change in thickness was taken on the bottom of the wing to give an effective dihedral angle. The principal wing dimensions are listed in table III.

### Fuselage

A section through the fuselage (see fig. 1) shows the arrangement of the components. The target-seeking equipment is mounted in the nose to prevent interference from the rest of the missile. The explosive, fuel tank, and power plant are installed behind the nose section in the order named. The location of the fuel close to the center of gravity of the airplane results in a relatively small center-of-gravity travel as the fuel is used. The axial exit for the engine and the nose intake are such as to provide the optimum combination of maximum inlet ram and minimum tail-pipe losses.

The automatic pilot is mounted in the wing root section and the tail surface controls are back of the engine. The fuselage can be built in separate sections and assembled at the launching site. The exact structural details were considered only on the basis of allowing sufficient room for the necessary structural members. The principal fuselage dimensions are included in table III.

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## Tail Surfaces

In view of the prime requirement of high speed and consequent low drag, it was decided to use a  $\Delta$ -type tail (reference 2) which has substantially less wetted area than the conventional tail for equivalent stability. The principal tail dimensions are given in table III.

A preliminary determination of the center-of-gravity position, which is required for the tail-surface design, is given in table IV for the two ranges of 400 and 1000 miles. No additional structural weight was allowed for the missile with a 1000-mile range because the structural-weight allowances for the 400-mile range missile were set higher than necessary to take care of a possible increased range.

The missile was designed for almost neutral stability in order to keep the control moments small. The longitudinal and yawing stability derivatives are listed in table V and are defined in references 3 and 4. The longitudinal derivative was calculated. The yawing derivatives were determined from the data of references 2 and 3. Stability calculations were not carried beyond this point because of the preliminary nature of the design but the missile stability should not be a serious problem.

Reference 1. Auyer, E. L.: Type 1 Supercharger Test Report - Type I-16A, Unit No. 71, Ser. No. 24271. Data Folder No. 47394, Supercharger Engineering Div., General Electric Co., March 15, 1944.

Reference 2. Greenberg, Harry: Comparison of Vee-Type and Conventional Tail Surfaces in Combination with Fuselage and Wing in the Variable-Density Tunnel. NACA TN No. 815, 1941.

Reference 3. Bamber, M. J., and Chase, R. O.: Wind-Tunnel Investigation of Effect of Yaw on Lateral Stability of a Characteristic. II - Rectangular N.A.C.A. 23012 Wing with a Circular Fuselage and a Fin. NACA TN No. 730, 1939.

Reference 4. Donlan, Charles J.: Some Theoretical Considerations of Longitudinal Stability in Power-on Flight With Special Reference to Wind-Tunnel Testing. NACA ARR, 1942.

Reference 5. Aircraft Engine Research Division, National Advisory Committee for Aeronautics, Cleveland, Ohio, September 20, 1944.

William Mutterperl,  
Aeronautical Engineer

Alan B. Johnson,  
Aeronautical Engineer



SECRET

CONFIDENTIAL  
Security InformationTABLE II.- DETAILED PERFORMANCE OF GUIDED MISSILE  
Wing area, 100 sq ft; profile-drag coefficient  $C_D$ 

Fuel load (lb)	Altitude (ft)	Range (miles)	High speed (mph)	Time of flight (hr)	Fuel for climb (lb)	Max rate of climb (ft/min)	Speed at max rate of climb (mph)	Take-off speed (mph)	Lift coefficient		
									Take off	Climb	Av high speed
1750	0	378	550	0.69	0	2140	316	186	1.1	0.38	0.11
	10,000	185	570	.89	193	1361	339			.44	.14
	20,000	600	580	1.14	459	675	372			.49	.19
1200	0	882	526	1.68	0	1210	325	208	1.1	.45	.14
	10,000	1173	562	2.16	365	675	356			.49	.17
	20,000	1135	566	2.77	1104	136	387			.54	.22

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POWERED BY ONE G.E. I-16 UNIT

0.018; dry weight, 7950 lb/

Thrust	Thrust	Air	Fuel	Specific	
Jet	Net	flow	consumption	fuel	Ceiling
(lb)	(lb)	(lb/sec)	(lb/hr)	consumption	(ft)
				(lb/thrust-hr)	
2567	1500	2200	41.8	1.16	28,600
2070	1226	1865	32.0	1.05	
1626	978	1513	24.0	.96	
2467	1465	2060	41.0	1.22	22,600
2054	1223	1833	31.8	1.06	
1608	965	1485	23.8	.99	



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TABLE I. - COMPARATIVE PERFORMANCE OF GUIDED MISSILE WITH VARIOUS TYPES OF POWER PLANT

Sea-level operation; range, 400 miles; profile-drag coefficient  $C_{Dp}$ , 0.018; wing area S, 100 sq ft; bomb load, 4000 lb

Type of power plant	High speed <sup>a</sup> (mph)	Take-off speed <sup>b</sup> (mph)	Weight (lb)			Thrust power output (hp)	Thrust (lb)		Air flow (lb/sec)	Fuel consumption (lb/hr)	Specific fuel consumption (lb per hp-hr)
			Bomb	Structure and controls	Power plant	Fuel	Jet $P_j$	Net $P_j - M_g V$			
R-1830 or V-1710	469	184	4000	3100	2000	1450	10,550	1500		1700	1.13
GE I-16	550	186	4000	3100	850	1850	9,800	2200		2543	1.16
Aeropulse:											
2 units	464	207	4000	3100	800	4150	12,050	1480		1644	1194
4 units	614	230	4000	3100	1600	6250	14,950	3540		3352	2162
										40	9600
										4800	3.24
										9600	2.71

<sup>a</sup> Profile-drag coefficient for four aeropulse units is 0.021.

<sup>b</sup> Maximum lift coefficient at take-off is 1.1.

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TABLE III.- PRINCIPAL DIMENSIONS OF GUIDED MISSILE

Wing	
Wing area, square feet .....	100
Span, feet .....	21.3
Root chord, feet .....	5.5
Tip chord, feet .....	4.0
Aspect ratio .....	4.5
Taper .....	1.38
Root section .....	65,2-212
Tip section .....	65,2-209
Fuselage	
Frontal area, square feet .....	12.57
Length, feet .....	25.25
Maximum diameter, feet .....	4
Fineness ratio .....	6.3
Tail surface	
Type .....	V
Dihedral angle, deg .....	35
Total area (outside fuselage), feet .....	12.5
Average chord (outside fuselage), feet .....	1.79
Semispan (outside fuselage), feet .....	3.5
Elevator area (outside fuselage), square feet ..	2.03

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TABLE IV.- CENTER-OF-GRAVITY ANALYSIS OF GUIDED MISSILE

Component	400-mile range			1000-mile range		
	Weight (lb)	Moment arm (ft)	Moment (lb-ft)	Weight (lb)	Moment arm (ft)	Moment (lb-ft)
Power plant	840	16.5	13,850	840	23.1	19,400
Fuel	1750	10.5	18,350	4200	12.0	50,400
Bomb	4000	5.25	21,000	4000	5.25	21,000
Fuselage	1900	12.0	22,800	1900	15.30	29,100
Wing	850	10.0	8,500	850	13.0	11,050
Tail	100	24.0	2,400	100	30.0	3,000
Control equipment	200	21.0	4,200	200	27.6	5,520
Target-seeking equipment	60	.7	42	60	.7	42
Total	9700		91,142	12,150		139,512
Full-fuel load c.g. position from nose, ft		9.40			11.45	
No-fuel c.g. position from nose, ft		9.18			11.21	
Total c.g. travel, percent chord		4.6			5.1	

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TABLE V.- STABILITY OF MISSILE FOR VARIOUS FLIGHT CONDITIONS

[For definition of symbols, see references 3 and 4.]

Static longitudinal stability		
Condition	$dc_{m_{cg}}/dc_L$	Elevator angle (deg)
High speed, 550 mph at 5000 feet; half fuel gone; airplane trimmed at $-3.75^\circ$ tail setting	-0.027	0
Take-off ( $C_L = 1.1$ )	-0.004	-0.43
End of climb, 385 mph, 20,000 feet; one-third fuel gone	-0.0193	-1.66
End of flight, 550 mph, sea level; no fuel	-0.05	-0.6
Static yawing derivative based on wing span		
Fuselage and wing $\frac{dC_{nfw}}{dU}$		0.0033
Tail in presence of wing and fuselage $\frac{dC_{nt}}{dU}$		-0.0055
Wing-fuselage-tail combination $\frac{dC_n}{dU}$		-0.0022

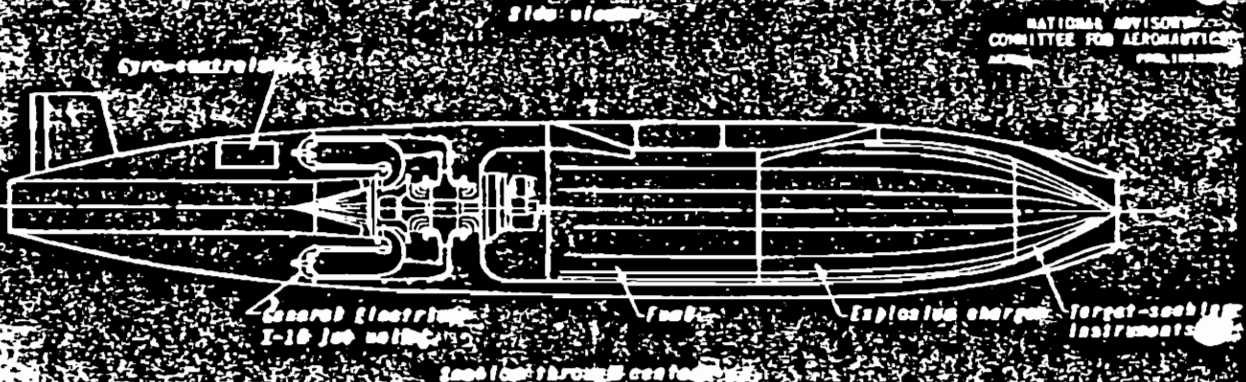
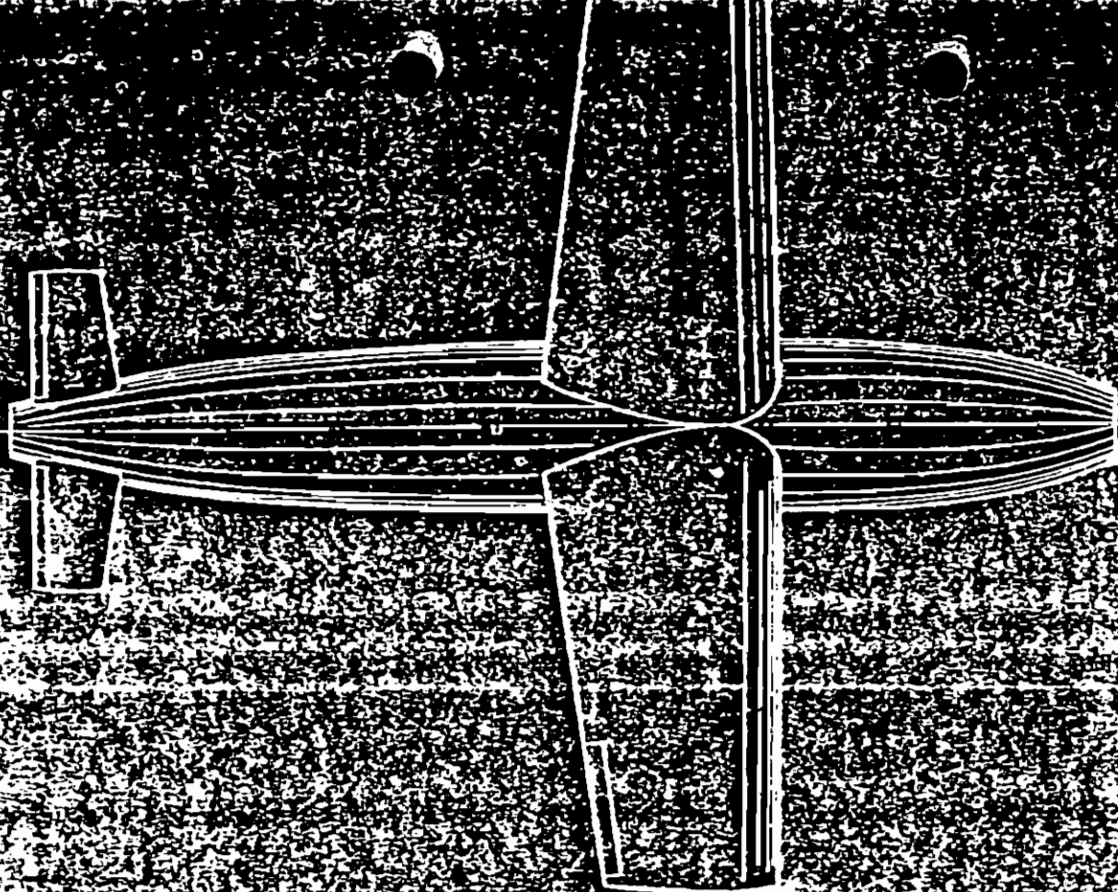
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NATIONAL ADVISORY  
COMMITTEE FOR AERONAUTICS  
REPORT NO. 100-1000

Figure 10. - Preliminary design study for jet-propelled guided missile. Wing area, 100 square feet; wing root section, NACA 65.2-212; wing tip section, NACA 65.2-200; gross weight, 8700 pounds; explosion charges, 4000 pounds; fuel weight, 1750 pounds; maximum speed at sea level, 550 miles per hour; take-off speed, 180 miles per hour; range at maximum speed, 370 miles.

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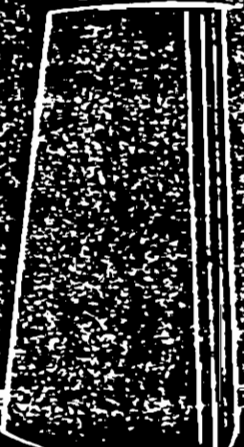
SECRET

22°-45'

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Front view



SAC, Cleveland (65-2730)

June 6, 1952

Director, FBI (65-59312)

WILLIAM PERL, aka  
ESPIONAGE - R  
PERJURY

ReBulet June 2, 1952, in the above-captioned matter wherein you were furnished with information relative to a preliminary analysis report prepared by subject Perl on September 20, 1944, entitled "Design Study of High-Speed Long-Range Guided Missiles" (NACA X-110).

As was pointed out therein, the NACA Lewis Flight Propulsion Laboratory, Cleveland, Ohio, has advised that it has no available record as to the exact number of copies of the above report which were printed. However, from an examination of the information contained on charge-out records of that Laboratory, Photostats of which were made available to the Bureau, it definitely appears that the various copies of this report were numbered. These records reflect that there were available at the Cleveland NACA Laboratory at least three copies identified as file number 141-A, copies 1, 2 and 3 of this report.

With respect to copy #2 of instant report, the records of the Cleveland NACA Laboratory indicate same was charged out to Abe Silverstein, Perl's immediate supervisor in the Laboratory, on September 25, 1944. It is interesting to note that on February 2, 1945, one D. Varr directed a memorandum to Silverstein to which there was attached a list of secret documents together with the dates same were charged out from the library. It was mentioned in this memorandum that the majority of these documents were overdue.

An examination of this list of documents reflects that copy #2 of 141-A (instant guided missile report dated September 20, 1944) was charged out on September 25, 1944. There also appears a notation as to this charge-out item to the effect that it was charged out "for Katterperl" and a penciled note, "See Bill." In view thereof, it can definitely be concluded that as of February 2, 1945, copy #2 of instant report which had been charged out by Silverstein had been entrusted to Perl and had not been returned to the library by him. No information is available to indicate whether it was ever returned and it is understood that no copies of the report are now available in that library.

RECEIVED - 129

Enclosure

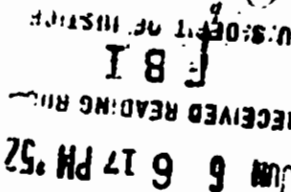
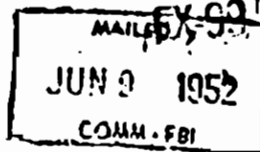
RECORDED - 174

65-59312-1714

cc: 8 - New York (65-15387)

2 - Cincinnati (65-1746)

JUN 11 1952



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In view of the foregoing information, it is requested that the Cleveland Office appropriately contact Mr. H. Burton Bracey, Security Officer, NACA, Cleveland, and make an effort to determine through him any other available information concerning the various copies of instant document which were formerly maintained in the library in the Laboratory. Likewise, an effort should be made to ascertain whether there is any record as to the exact copy numbers of the ten copies of instant report which were designated to the Army Air Force, Technical Service Command, Wright-Patterson Field, Ohio. An effort should be made further, through an examination of any available charge-outs, inventory or any pertinent records, to develop any information indicating the disposition which may have been made of the various copies of this report which were previously maintained in the NACA library and particularly, to ascertain whether copy #2 was ever returned to the library by either Silverstein or Perl. With respect to the latter, you may desire to contact D. Barr, possibly a librarian, or have an appropriate inquiry made of Silverstein for the purpose of determining whether either might recall any details concerning this incident. All logical lines of investigation which might be expected to resolve the question as to the disposition of the Cleveland NACA Laboratory's copies of instant report should be vigorously pursued.

A Photostat of each of the Cleveland NACA Laboratory records previously referred to herein is being forwarded herewith for the assistance of the Cleveland Office in conducting this investigation. Your attention is particularly invited to the previously referred to D. Barr memorandum to Silverstein dated February 2, 1945, and its attachments. It will be noted that the list of various secret documents charged out to Silverstein as of the date of this memorandum appears in the attachments. It is desired that you determine whether all of the documents indicated on this list as being overdue were actually returned to the library. You should also endeavor to ascertain the exact meaning of the penciled notations appearing on the memorandum as well as the attachments.

It will also be noted that among the Photostats pertaining to copy #2 of instant report (141-A), there appears a form entitled "Special Document Circulation Record" (form C-807). There is a penciled notation on this form which indicates that "AS," undoubtedly referring to Abe Silverstein, received this copy as of June 29 (year not indicated). The purport of this notation is not readily understandable unless same is intended to reflect that Silverstein still had this copy charged out to him as of June 29, 1945, or a date subsequent thereto.



You should determine if possible the exact date the above document circulation record was executed, by whom, the identity of the person "Alca," whose name appears in the upper left-hand corner, the date this was marked declassified, and the person who placed the latter notation thereon. In this respect, you are aware that instant document pertaining to a high-speed, long-range, guided missile was never declassified and was not reclassified from secret to confidential until May 5, 1952. Thus the notation "declassified" is obviously incorrect and should never have been placed on this record.

The Cincinnati Office is being requested to expedite the investigation at the Wright-Patterson Air Base as requested in alet and to furnish the results thereof, particularly with respect to the exact number of copies of instant design study report furnished to AAF by RACA and the ultimate disposition of each copy, to the Cleveland Office in order to assist in their investigation in this matter.

RECEIPT FOR DOCUMENTS RETURNED TO NACA BY FBI

- (1) "Investigations of Jet-Propulsion Engines in the NACA Altitude Wind-Tunnel."
- (2) "Altitude Wind-Tunnel Investigations of Thrust Augmentation of Turbojet Engine. I-Performance with Tail-Pipe Burning."
- (3) "Final Report of Development of XP-59A and YP-59A Model Airplanes."
- (4) "Thrust-Augmentation Tests of Type I-16 Jet-Propulsion Engine by Bleedoff and Water and Alcohol Injection."
- (5) "The Locus of Possible Positions of a Heavy Bomber in Space after a 12-Second Time Interval."
- (6) "Calculated and Measured Turning Performance of a Navy F2A-3 Airplane as Affected by the Use of Flaps."
- (7) "Effects of Compressibility on the Maximum Lift Characteristics and Spanwise Load Distribution of a 12-Foot-Span Fighter-Type Wing of NACA 230-Series Airfoil Sections."
- (8) "Effect of Mach and Reynolds Numbers on the Power-Off Maximum Lift Coefficient Obtainable on a P-39N-1 Airplane as Determined in Flight."
- (9) "Effect of Mach and Reynolds Numbers on the Maximum Lift Coefficient Obtainable in Gradual and Abrupt Stalls of a Pursuit Airplane Equipped with a Low-Drag Wing."
- (10) "Preliminary Investigation of the Effect of Compressibility on the Maximum Lift Coefficient."
- (11) "Wing Pressure-Distribution Measurements up to 0.85 Mach Number in Flight on a Jet Propelled Airplane."
- (12) "Wind-Tunnel Tests of the Gorgon IIA and IIB Airframes. II - Power-Off Longitudinal and Lateral Stability and Control."
- (13) "Design, Construction and Preliminary Flight Tests of a 14" RE30JET Power Plant for the GORGON II-C Controlled Missile."
- (14) "AN APN-58 Status and Progress."

(continued)

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165-59312-713

JUN 23 1952

JUN 2 1952

NACA

RECEIPT FOR DOCUMENTS RETURNED TO NACA BY FBI (continued)

(15) "High-Speed Wind-Tunnel Tests of a 1/3-Scale Model of the XP-80 Airplane."

(16) "Final Report of Development, Procurement, Performance and Acceptance-XP-80-Airplane."

(17) "Wind-Tunnel Tests of a 1/4-Scale Model of the Bell XS-1 Transonic Airplane (Army Project MX-653). I - Longitudinal Stability and Control Characteristics."

(18) "Wind-Tunnel Tests of a 1/4-Scale Model of the Bell XS-1 Transonic Airplane (Army Project MX-653). II - Lateral and Directional Stability and Control."

(19) "Force and Longitudinal Control Characteristics of a 1/16-Scale Model of the Bell XS-1 Transonic Research Airplane at High Mach Numbers."

(20) "Aerodynamic Characteristics of 24 NACA 16-Series Airfoils at Mach Numbers between 0.3 and 0.8"

*Lloyd W. Blankenbaker*

Lloyd W. Blankenbaker  
Assistant Security Officer, NACA

Date: 6/17/52

# Office Memorandum • UNITED STATES GOVERNMENT

TO : DIRECTOR, FBI (65-59312)  
 FROM : SAC, CLEVELAND (65-2730)  
 SUBJECT: WILLIAM PERL, aka  
 ESPIONAGE - R  
 PERJURY

DATE: July 3, 1952

**TOP SECRET**

STRICTLY

Mr. Nichols
Mr. Belmont
Mr. Clegg
Mr. Glavin
Mr. Harbo
Mr. Rosen
Mr. Tracy
Mr. Ladd
Tele. Room
Mr. Holloman
Miss Gandy

Rebuletts, June 2 and 6, 1952. (u)

Referenced letters indicate that previous efforts to impute knowledge of the JB-2 bomb to WILLIAM PERL have been unsuccessful; requested that ALAN D. JOHNSON be interviewed concerning PERL's participation in this project, and that investigation be conducted concerning the document prepared by JOHNSON and PERL entitled, "Preliminary Analysis, Design Study of High-Speed Long-Range Guided Missiles," dated September 20, 1944. (u)

As noted in Cleveland letter, January 21, 1952, ROBERT T. JONES, NACA scientist, assigned to Langley Field, Virginia, visited NACA, Cleveland, and attended a Ram Jet Conference on November 11, 1944, with the subject. At this time, JONES was primarily engaged in work on the JB-2 and it was shortly after his visit that copy No. 55 of "Guided Missiles, Development, Status and Availability" was first missed. PERL's position as a member of this committee, (u)

RECORDED - 52

INDEXED - 52

JBC'D:nem

ccs: Cincinnati (65-1744) (RM)  
 Los Angeles (65-5075) (RM)  
 New York (65-15387) (RM)  
 San Francisco (65-) (RM)  
 Washington Field (65-553) (RM)

JUL 7 1952

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A 26 NOV 22 1964

REGISTERED MAIL

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SECURITY INFORMATION

Classified by 5886 3/4/78  
 Exempt from GDS, Category 1, 2  
 Date of Declassification Indefinite

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DIRECTOR, FBI

plus the previously reported statements of ~~CARLTON KEMPER~~, Executive Engineer, NACA, and ~~JESSE WALL~~, Assistant Chief of Research, among others, certifies to PERL's access to any and all material concerning such a program, (u) as well as other research conducted at NACA.

ALAN D. JOHNSON, Aeronautical Research Scientist, advised the writer that he well remembers preparing the "Preliminary Analysis," referred to above, with PERL during the Summer of 1944, but is unable to recall if PERL had maintained a copy of this document for his personal use. He stated that he, too, was a member of the Ram Jet Committee and although he did not specifically recall any particular documents to which he and PERL had access, he felt certain that PERL, because of the high regard in which he was held and because of his position at NACA, was furnished with all classified material of any importance. He had no knowledge of the number of copies prepared of the "Preliminary Analysis." (u)

A review of records of the NACA Library was made with the assistance of Miss ETHEL V. LYON to ascertain to whom copies of PERL's and JOHNSON's report had been charged and for what periods. No copies of this document are now available in Cleveland; however, two charge-outs were located, one of which reflected that a copy had been sent to ABE SILVERSTEIN as of September 25, 1944, (copy No. 2). There were no other records of charge-outs and both copies No. 1 and No. 2 were inventoried in the library as of September, 1948, indicating SILVERSTEIN's copy was returned prior to that date. It was noted that the photostat of the charge-out for this document, furnished by the Bureau, indicated that this charge-out covered copy No. 2, however, this is an entirely different charge-out than the one maintained in the library and it is believed that, in fact, the photostatic copy refers to copy No. 3 (note the No. 3 is crossed out). This charge-out was located by E. BURTON BRACY, Security Officer, in the Supersonic Wind Tunnel Building in an office formerly used by ABE SILVERSTEIN. The notation "Alma" in the upper left hand corner was placed thereon by Mr. BRACY to indicate that this paper had been taken from files maintained by ALMA WILDY, Secretary to J. C. EVVARD, Supersonic Wind Tunnel Building, who assumed SILVERSTEIN's duties when the latter was named Chief of Research. Miss WILDY has previously been interviewed in this matter and it is noted that she merely inherited these papers in the Supersonic Wind Tunnel files (u)

DIRECTOR, FBI

and is not familiar with their origin. No record of the number of copies could be located. (u)

It was explained by Miss ~~LEE~~ that prior to 1946 the library had little or no control over a great many documents. She stated that papers of extreme importance and papers of certain projects were received in the office of the Chief of Research or the Executive Engineer and were not seen by the library, nor indexed by it. As a result, charge-out records for this period have in many instances been destroyed. This was corroborated by CARLTON KEEFER, who advised that his former Secretary, Mrs. DOLORES BARR, had maintained personal charge-outs for a great many documents and that at certain times she would "tickle" the various division chiefs for documents which had been charged out to them for a lengthy period of time. A search of files maintained by Mr. BRACY reflected a number of such memoranda directed to various division chiefs, including five or six pages to Mr. ABE SILVERSTEIN, in addition to the two photostats which were furnished with rebulet of June 6. According to Mr. KEEFER, Mr. BRACY and Miss LYON, it would be physically impossible to trace these documents at this date, since all Mrs. BARR's charge-out records have been destroyed and in view of the library's position, as outlined above. Mrs. BARR is no longer with NACA and her whereabouts are not now known. It will be recalled this same problem was faced when attempting to trace charge-outs and circulation records of the Lexington Report. (u)

Mr. BRACY confidentially advised that the NACA staff is quite upset over the condition of the library charge-out and maintenance system. As a result, the library is now undergoing a complete survey and there is a very strong possibility that Miss ~~LEE~~ may be asked to resign. (u)

It was noted in referenced letter of June 6 that a question was raised as to the meaning of the written notation "declassified," which was placed on the charge-out record, a photostat of which was enclosed with referenced letter. While searching library records, it was noticed on the two charge-outs for copies No. 1 and No. 2 of the "Design Study" that on November 29, 1948, copies of this document were sent to the Air Force Liaison Section for declassification. There was no indication that the documents had been declassified, but it was the opinion of Mr. BRACY and Mr. JESSE HALL (u)

~~TOP SECRET~~

DIRECTOR, FBI

~~TOP SECRET~~

that, in all probability, when these documents were sent to Liaison someone in the Supersonic Wind Tunnel Building had assumed the documents would be declassified and had so noted on the charge-out record in question. (u)

[REDACTED]

It is of interest to note that the Ram Jet Committee was headed by EASTMAN N. JACOBS, who is prominently mentioned in the case entitled, "HERMAN EPSTEIN, ESPIONAGE - R," (Bufile unknown), and who may be involved in Communist activities. JACOBS was employed by NACA from 1925 to 1945 and is, according to NACA officials, an engineer of world renown in the field of Aerodynamics. It is suggested the Bureau may desire to have JACOBS interviewed concerning his knowledge of PERL, as well as his own activities. (u)

OK An early interview with ABE SILVERSTEIN is planned concerning HAROLD and SIDNEY JAMES and other matters concerning WILLIAM PERL and UACB the problems posed in rebuletts will be discussed in general with SILVERSTEIN. (u)

It is felt that evidence can be secured to show PERL had access to information regarding most projects at NACA, although proving possession of a given document may not always be possible. In particular, it is not believed that NACA employees will state, though possibly true, that PERL had access to AEC restricted data unless subpoenaed before the Federal Grand Jury, since to do so would be evidence of a violation of the Atomic Energy Act against the person authorizing such access. (u)

~~TOP SECRET~~

- 4 -



UNITED STATES DEPARTMENT OF JUSTICE

FEDERAL BUREAU OF INVESTIGATION

American Embassy  
1, Grosvenor Square  
London, W. 1

In Reply, Please Refer to  
File No.

SECRET - AIR COURIER

~~SECRET~~

Date: July 22, 1952

To: Director, FBI

(65-59312)

From: Legal Attache  
London, England

(65-751)

Subject: ALFRED PERL, aka  
ESPIONAGE - R; PERJURY

Classified by ~~5886~~ 3/14/78  
Exempt from GDS, Category 1  
Date of Declassification Indefinite

Rebuletts 3-13-52, 3-25-52, and 6-12-52. (U)

[REDACTED]

(S)

PROCESSING

U.S. 31 1952

65-59312-723

JHO:CFJ

Enclosure

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INDEXED - 73

~~SECRET~~



Director, FBI

7-22-52

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

(S)

Director, FBI

7-22-52

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

(S)

[REDACTED]

[REDACTED]

~~SECRET~~

Director, FBI

7-22-52

[REDACTED] (S)

[REDACTED] (S)

[REDACTED] (S)

There are being returned herewith the following items:

1. NACA Data Sheets:

2. Report captioned "Justification of Need for Construction for Fluid and Gas Dynamics Analysis Laboratory."
3. Report No. 1079, "U.S. Naval Ordnance Laboratory."
4. Department of Navy Secret Memorandum, dated February 6, 1952, from the Commander of U. S. Naval Ordnance Laboratory, re "Construction Diagram and Description of U. S. Naval Ordnance Laboratory, Request For."

(u)

~~SECRET~~



UNITED STATES DEPARTMENT OF JUSTICE

FEDERAL BUREAU OF INVESTIGATION

In Reply, Please Refer to  
File No.

American Embassy  
1, Grosvenor Square  
London, W. 1

SECRET - AIR COURIER

~~SECRET~~ (rs)

Date: July 22, 1952

To: Director, FBI

(65-59312)

From: Legal Attache  
London, England

(65-751)

Subject: WILLIAM PERL, aka  
ESPIONAGE - R; PERJURY

Classified by 5886 3/14/78  
Exempt from GDS, Category 1  
Date of Declassification Indefinite

ReBullets 3-13-52, 3-25-52, and 6-12-52. (u)

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

let me  
8/14/52  
APP: [unclear]  
let me  
8/14/52  
APP: [unclear]  
let me  
8/14/52  
APP: [unclear]

let me  
8/14/52  
APP: [unclear]  
let me  
8/14/52  
APP: [unclear]

RECEIVED  
JUL 27 1952

JFO:CFJ

Enclosures

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INDEXED - 73

165-59312-723

JUL 26 1952

Director, FBI

7-22-52

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

(S)

Director, FBI

7-22-52

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

(5)



~~SECRET~~

~~SECRET~~

Director, FBI

7-22-52

[REDACTED] (S)

[REDACTED] (S)

[REDACTED] (S)

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  2. Report captioned "Justification of Need for Construction for Fluid and Gas Dynamics Analysis Laboratory."
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  4. Department of Navy Secret Memorandum, dated February 6, 1952, from the Commander of U. S. Naval Ordnance Laboratory, re "Construction Diagram and Description of U. S. Naval Ordnance Laboratory, Request For."
- (u)

~~SECRET~~

~~SECRET~~

SECURITY INFORMATION

~~SECRET~~

0306344

65-59312

BY SPECIAL MESSENGER

Date: August 18, 1952  
To: Director  
National Advisory Committee for Aeronautics  
1724 F Street, N.W.  
Washington, D. C.

Attention: Mr. Robert L. Bell  
Security Officer

From: John Edgar Hoover, Director  
Federal Bureau of Investigation

Subject: WILLIAM PEARL, aka.  
ESPIONAGE - R; PERJURY

RECORDED - 159

AUG 19 1952

65-59312-725

APL:emo:rd pd

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BY SPL. MSGR.

37 AUG 19

~~SECRET~~

58 AUG 26 1952

COMM - FBI

SECURITY INFORMATION - ~~SECRET~~

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SECURITY INFORMATION - ~~SECRET~~



CC SECURITY INFORMATION - ~~SECRET~~

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

- 3 -  
SECURITY INFORMATION - ~~SECRET~~

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[REDACTED]

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(U)

Attachment

SECURITY INFORMATION - SECRET

~~SECRET~~



Julius Rosenberg Et AL.

Referral  
National  
Aeronautics  
And Space  
Administration

No. 17

Appeal to:

Mr. Miles Waggoner

Freedom of Information Officer

National Aeronautics & Space Administration  
Washington D.C. 20546

REFERRAL

Reviewed by:

*[Signature]*

Packet 17

AGENCY National Aeronautics and Space Administration

Subject and File Number	Serial	Date	Document Description	No. of Pages Actual Released
1 Per1(HQ)65-59312	539	1/4/51	W.F.O Letter to HQ	1
2 " " " "	549	9/25/51	HQ Teletype to NY	1
3 " " " "	556	10/6/51	C.V. report to HQ w/COPY OF cover sheet	9/1
4 " " " "				1
5 " " " "	599	11/28/51	NF report to HQ w/COPY OF cover sheet	3/1
6 " " " "				1
7 Per1(HQ)65-59312	684	3/3/52	C.V. Letter to HQ	4
8 Sidorovich(C.V)65-2730	394	1/4/51	C.V. memo to file	5
9 " " " "	431	2/27/51	" " " "	2
10 Per1(HQ)65-59312	650	1/17/52	HQ Letter to NY	1
" " " "	650	1/8/52	National Advisory Committee For Aeronautics Letter to HQ	4
12 " " " "	668	2/5/52	National Advisory Committee For Aeronautics Letter to HQ	1

## Office Memorandum • UNITED STATES GOVERNMENT

TO : DIRECTOR, FBI (65-59312)

FROM : SAC, WFO

SUBJECT: WILLIAM PERL, wa.  
ESPIONAGE - R

DATE: October 4, 1951

Re New York tel September 24, 1951. There are being furnished the New York Office by registered mail copies of five expense vouchers executed by subject from the period of December, 1943, until his termination of employment by the National Advisory Committee for Aeronautics, along with miscellaneous papers incidental thereto. According to Mr. ROBERT BELL, Security Officer of the NACA, these documents obtained from the Lewis Laboratory, Cleveland, constitute the only vouchers submitted by PERL while at the Lewis Laboratory. BELL further advised that inquiry by him at Langley Field, Virginia, revealed no record of any travel or expense vouchers submitted by PERL while stationed at that place, and that it was unlikely that PERL's work had necessitated travel during that period. It is requested that the foregoing documents be returned to the Washington Field Office for transmittal to BELL after they have served their purpose.

RLS:cs

65-5543

cc - New York (65-15387) (Enclosure) (REGISTERED)

cc - Cleveland (65-2730)

RECORDED - 23

65-59312-539  
OCT 5 1951

September 25, 1951

DEFERRED

SAC'S NEW YORK  
WASHINGTON FIELD (BSM)

RECORDED - 32

65-59812-549

WILLIAM PERL, WAS, ESP R, PERJURY.

REURTEL SEPTEMBER TWENTY-FOUR, FIFTY-ONE, RE EXPENSE VOUCHERS  
PERL. [NACA ADVISE ALL THEIR VOUCHERS MORE THAN FIVE YEARS OLD  
DESTROYED BUT ORIGINALS STILL AVAILABLE GENERAL ACCOUNTING  
OFFICE.] WFO REQUESTED OBTAIN COPIES ALL VOUCHERS AVAILABLE  
NACA AND EARLIER VOUCHERS AT GAO. [NACA INDICATED NO EXPENSE  
VOUCHERS SUBMITTED BY PERL FOR JANUARY, FIFTY. HIS FEBRUARY,  
FIFTY, VOUCHER REFLECTED LEFT CLEVELAND TWO FIFTY P.M. <sup>FEBRUARY ONE</sup> VIA UAL  
ARRIVING NYC FOUR THIRTY P.M. REMAINED NYC UNTIL EIGHT FIFTEEN  
A.M. FEBRUARY SIX, WHEN RETURNED CLEVELAND, ARRIVING TEN TWENTY-  
FIVE A.M. VOUCHER INDICATED SPENT FEBRUARY TWO THROUGH FOUR IN  
NYC RECRUITING TECHNICAL PERSONNEL FOR LEWIS FLIGHT PROPULSION  
LABORATORY.]

HOOVER

CC: WASHINGTON FIELD (BY SPECIAL MESSENGER)

65-59812

EFE:mpm

NOTE: Above information obtained telephonically from Mr. Robert  
Bell, Security Officer, NACA.

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RECEIVED  
U.S. DEPARTMENT OF JUSTICE  
GENERAL INVESTIGATIVE DIVISION

SEP 23 1951

TELETYPE

OCT 20 1951

11-44

SEP 26 10 39 AM '51

RECEIVED  
U.S. DEPARTMENT OF JUSTICE  
GENERAL INVESTIGATIVE DIVISION  
SEP 26 10 39 AM '51

Handwritten signatures and initials.

Handwritten initials.

## FEDERAL BUREAU OF INVESTIGATION

FORM NO. 1  
THIS CASE ORIGINATED AT

FILE NO.

NEW YORK

65-2730

REPORT MADE AT <b>CLEVELAND</b>	DATE WHEN MADE <b>10-6-51</b>	PERIOD FOR WHICH MADE <b>7-16, 20, 24, 26, 27; 8-6, 9-18, 20, 10-2-51</b>	REPORT MADE BY <b>JOHN B. O'DONOGHUE dht</b>
TITLE <b>WILLIAM PERL, wa.</b>			CHARACTER OF CASE <b>ESPIONAGE - R (PERJURY)</b>

## SYNOPSIS OF FACTS:

Leave records, NACA, failed to indicate subject absent from work 7-29-44. Total leave recorded for year is twenty-two days. However, subject indicated in personnel memo he had taken twenty-eight days as of 11-9-44. July 29, 1944, a Saturday, was official work day as were all Saturdays during 1944. ROLF W. LANDAUER not known to be associated with PERL at NACA. Mrs. JOSEPH LEVINE denies any knowledge of the subject and/or Lexington Report. Investigation 2744 Mayfield Road negative.

8-1  
22

R. R. 2

- P -

## Details:

MAX and HELENE SLITCHER have advised they had a dinner date at the Bird-In-Hand Restaurant in New York City with the subject, JULIUS ROSENBERG, and others sometime during September, 1944. They have recently, however, come to the conclusion that this dinner engagement most probably occurred toward the end of July, 1944.

The leave records of the Bureau of Ordnance, Navy Department, Washington, D.C., reflect

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(See Page 1-A)

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CV. F. O.  
65-2730

Copies of This Report:

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- 1 - Philadelphia (65-4384)
- 1 - San Francisco
- 1 - Washington Field (65-5543)
- 4 - Cleveland



CV. W. O.  
65-2730

that MAX ELITCHER was on leave in 1944 during the month of July from 3:30 p.m. on July 27th until 4:30 p.m., July 31st, and in August from August 26th to September 2nd.

Army leave records reflect that SAM PERL, who allegedly was also present at the dinner party, was on furlough from July 21, 1944, through August 4, 1944.

A review of the leave records at the Lewis Flight Propulsion Laboratory, National Advisory Committee for Aeronautics, was again made by the writer and no additional leave could be found for PERL for the year 1944 other than that previously reported. It was noted, however, in PERL's personnel file that he had directed the following memorandum to the Manager of the Laboratory:

"Cleveland, Ohio,  
November 9, 1944.

"MEMORANDUM For Manager.

"Subject: Overdrawn leave.

"1. I have taken a total of 28 days leave this year. My leave is therefore 8 days in excess of the maximum time granted.

"2. The overdrawal of leave was made necessary by my marriage and the ensuing difficulty of locating a suitable place to live.

"3. It is requested that the excess leave be granted as annual leave.

/s/

William Lutterperl,  
Aeronautical Engineer.

"WLL:mg  
AS"

CV. F. O.  
65-2730

As it will be noted in this memorandum, PERL states that as of November 9, 1944, he had taken a total of twenty-eight days' leave for the current year and that his leave, therefore, was eight days in excess of the maximum time allowed. [NACA records reflect that PERL took but twenty-two days for the entire year and that as of November 9, 1944, he had taken only seventeen. Attached hereto are photostatic copies of PERL's leave cards for the year 1944 which are self-explanatory.]

In attempting to pinpoint any official leave taken by PERL, a review was made of his expense vouchers for the year 1944. However, only one voucher was located which was dated January and which covered his transfer from the Langley Memorial Aeronautical Laboratory to the Lewis Flight Propulsion Laboratory (then Aircraft Engine Research Laboratory).

Miss JULIA GREEN, who is in charge of Time, Leave and Payroll Records at the Lewis Flight Propulsion Laboratory, advised from a review of records in her possession that July 29, 1944, a Saturday, was a work day at NACA and a six-day work week was in effect throughout the entire year of 1944.

Mr. ROBERT BELL, Chief Security Officer, NACA, has advised that ROSE W. LANDAUER, who is employed in the Materials and Stresses Section, NACA, was recruited by WILLIAM PERL. It is noted that by recruitment BELL meant LANDAUER's services had been secured for the Laboratory.

A review of LANDAUER's file was made by SA EDWARD J. MOORE, JR. Nothing of a derogatory nature was noted.

Mr. H. BURTON BRACEY, Security Officer, NACA, Cleveland, advised the writer that LANDAUER was the only person who came to NACA as a result of PERL's recruiting program conducted at Columbia University during February, 1950. According to BRACEY, LANDAUER was brought to Cleveland specifically to assist in the development of nuclear energy as it pertains to the aircraft industry but he has been unable to be of any assistance since he has not received Atomic Energy Commission clearance. BRACEY also advised there was no indication of any association between PERL and LANDAUER while they were both employed by NACA.

ROBERT BELL, previously described, has also advised that IRVA C. LEVINE, wife of JOSEPH LEVINE, NACA, Cleveland, and a former NACA employee

CV. F. O.  
65-2730

7  
herself, had at one time acted as secretary to ALFRED BOBROWSKY and may have had access to the Lexington Report.

Mrs. JOSEPH LEVINE, 29602 Foote Road, Bay Village, Ohio, was interviewed by SA FREDERICK L. EDWARDS and the writer, at which time she advised she had no contact with the subject at any time and was not acquainted with the Lexington Report. She advised that she worked in the Lubrication and Wear Section, Engine Research Building, NACA, Cleveland, where her only contact with any matters which may have been related to the Atomic Energy Commission consisted of a project on the purification of uranium. The request was made for her to do this work by ALFRED BOBROWSKY. However, she was unable to carry her studies to any extent since a physical examination revealed her blood system would not permit close work with uranium.

She advised she also had done some work with BERT ROSENBAUM on micro-constituents in high temperature alloys which involved X-ray patterns in attempting to identify the constituents. She advised this work was done in 1948 and she worked closely with ALFRED BOBROWSKY on this although she did not know the exact work BOBROWSKY was doing. She advised that she did not act as secretary to BOBROWSKY at any time but had on several occasions done clerical work for ED ELSSON.

The following investigation was conducted by SA EDWARD J. MOORE, JR.:

On September 20, 1951, SA MOORE interviewed Mrs. ELIZABETH CSEHEK, 1840 Rock Road, Cleveland, Ohio, who was the janitress at 2744 Mayfield Road from September, 1938, until April, 1944. It will be recalled previous investigation has reflected that PERL under the name WILLIAM MUTTERPERL resided at this address from November 2, 1944, until November 6, 1944. Mrs. CSEHEK advised that she was not connected with the apartment during the subject's residence there. However, she recommended Mrs. GERTRUDE GOODMAN, who has lived at that address for approximately thirteen years.

SA MOORE contacted Mrs. GOODMAN and furnished her photographs of the subject as well as other members of the ROSENBERG espionage parallel. However, Mrs. GOODMAN was unable to recall the subject and could not identify any of the photographs presented to her.

CV. F. O.  
65-2730

Mrs. ANNA DADRIDGE, a cleaning woman for all the apartments in this building for the past fourteen years, was also furnished photographs of the subject and other members of the ROSENBERG espionage parallel. However, she was unable to furnish any information of value.

- P E N D I N G -

CV. F. O.  
65-2730

LEADS

No leads are being set forth in this report since all requests for investigation are being handled by teletype and/or letter.

Reference: Report of SA (A) EDWARD J. CAMILL 9-10-51, New York.  
Report of SA JOHN B. O'DONOGHUE 7-20-51, Cleveland.

# LEAVE CARD

*William Mitterperl*  
 Accrued 63 0 1/4  
 Current 26  
 Total 89 0 1/4  
 Time Clerk  
 from LMA 12/3/42

Days	From	To	Employ. Initial	Approved	TOTAL TAKEN	RECORD
					Days	Rate
TOTAL TAKEN AT LMA						
3	8:30am 11:30am	12-23-43	W.M. Mitterperl		10 5	Rmb
4	1:00pm 5:00pm	1-3-44	W.M. Mitterperl		4	Rmb
1/2	8:30am 9:00am	1-4-44	W.M. Mitterperl		4 1/2	per
1	8:30am 9:45pm	2-14-44	W.M. Mitterperl		5 1/2	per
1/2	9:00 9:30	1-4-44	W.M. Mitterperl		6	per
3	1:00pm 3:35pm	2-26-44	W.M. Mitterperl		1 1	per
1	8:30am 9:30am	3-22-44	W.M. Mitterperl		1 2	per
1	8:30 9:30am	1/10/44	W.M. Mitterperl		1 3	per
1	8:30 9:30am	2/1/44	W.M. Mitterperl		1 4	per
1	8:30 9:30am	2/7/44	W.M. Mitterperl		1 4	per
1	8:30 9:30am	2/22/44	W.M. Mitterperl		1 5	per
1	8:30 9:30am	2/28/44	W.M. Mitterperl		1 5	per
3 0	8:30am 5:00pm	4/12/44 5/5/44	W.M. Mitterperl		4 5	per
1	8:30am 9:30am	5/19/44	W.M. Mitterperl		4 6	per
1	8:30am 9:30am	5/27/44	W.M. Mitterperl		4 7	per
7	6/10/44 6/17/44		W.M. Mitterperl		11 7	per
1	8:30 9:30	8-5-44 8-3-44	W.M. Mitterperl		12	per
1	7-22-44 7-22-44		W.M. Mitterperl		12 7	per
1	8:30 5:30	8-29-44 8-29-44	W.M. Mitterperl		14	per
1	8:30 5:30	8-30-44 8-30-44	W.M. Mitterperl		14 9	per
1	8:30 5:30	8-31-44 8-31-44	W.M. Mitterperl		14 9	per
1	8:30 5:30	9-1-44 9-1-44	W.M. Mitterperl		14 9	per
1	8:30 5:30	9-2-44 9-2-44	W.M. Mitterperl		14 9	per
1	8:30 5:30	9-3-44 9-3-44	W.M. Mitterperl		14 9	per
1	8:30 5:30	9-4-44 9-4-44	W.M. Mitterperl		14 9	per
1	8:30 5:30	9-5-44 9-5-44	W.M. Mitterperl		14 9	per
1	8:30 5:30	9-6-44 9-6-44	W.M. Mitterperl		14 9	per
1	8:30 5:30	9-7-44 9-7-44	W.M. Mitterperl		14 9	per
1	8:30 5:30	9-8-44 9-8-44	W.M. Mitterperl		14 9	per
1	8:30 5:30	9-9-44 9-9-44	W.M. Mitterperl		14 9	per
1	8:30 5:30	9-10-44 9-10-44	W.M. Mitterperl		14 9	per
1	8:30 5:30	9-11-44 9-11-44	W.M. Mitterperl		14 9	per
1	8:30 5:30	9-12-44 9-12-44	W.M. Mitterperl		14 9	per
1	8:30 5:30	9-13-44 9-13-44	W.M. Mitterperl		14 9	per
1	8:30 5:30	9-14-44 9-14-44	W.M. Mitterperl		14 9	per

## ANNUAL

Days	From	To	Employ. Initial	Approved	TOTAL TAKEN	RECORD
					Days	Rate
1	9-22-44 9-22-44		W.M. Mitterperl		20 4	per
6	8:30 5:00	9-29-44 9-29-44	W.M. Mitterperl		21 2	per
1	8:30 9:00	9-30-44 9-30-44	W.M. Mitterperl		21 3	per
1	8:30 9:00	10-1-44 10-1-44	W.M. Mitterperl		21 5	per
1	8:30 5:00	10-12-44 10-12-44	W.M. Mitterperl		21 5	per
1	8:30 5:00	11-2-44 11-2-44	W.M. Mitterperl		21 5	per

### SICK

Accrued 34 7 1/2  
 Current 15 0 0

PURCHASED ANNUAL  
 11/27/44

### LEAVE WITHOUT PAY

### ABSENCE WITHOUT PERMISSION

Now.—Employee must secure approval of his superior before going on leave. Requests for leave without pay require approval of division head. For other requests approval of section head is sufficient. All requests of section heads require approval of division chief. Each leave in excess of 2 weeks shall be supported by a certificate of a registered practitioner or physician. For sick leave absence of 3 work days or less, the total of which shall not exceed 12 work days in any one calendar year, the statement on this form may be accepted.



LEAVE CARD

Time *Mutter, Veri, William* Days, Hrs.  
*Eng. Inst. Res.* Time Clerk Accum. *2.1*  
 Current *2.1*  
 ANNUAL Total *2.9*

Issue 11/8/44 ANNUAL

DATE		FROM		TO		Employ.	As-	TOTAL TAKEN		RECORD
Days	Hrs.					Initial	proved	Days	Hrs.	
		R-L to date				44		21	4	44
		Jan 9, 1915								44
		10:30 5:00						6	6	44
		4 1:40 5:00								44
		6-24-44						22		44
		8:30 9:00						Used	ED	44
		BT 8 1/2 144						22		44
		8:30 9:00						Used	ED	44
		5-10-44						20		44

## ANNUAL

[illegible]

**SICK**

Total S.C. to  
date 1944

94-7-45  
49-7-45

2 Feb

**LEAVE WITHOUT PAY**

**ABSENCE WITHOUT PERMISSION**

NOTE: Employee must secure himself of approval of his superior before going on leave. He may go away without pay request approval of Employer in case he or other requests approval of action based on settlement. All requests of this kind require approval of division chief. Sick leave in excess of 3 work days shall be supported by a certificate of a qualified physician, physician or practitioner. For sick leave absence of 3 work days or less, the applicant's signed statement to this form may be accepted.

## FEDERAL BUREAU OF INVESTIGATION

FORM No. 1  
THIS CASE ORIGINATED AT

NEW YORK

FILE NO.

CV. 65-2730

REPORT MADE AT <b>CLEVELAND</b>	DATE WHEN MADE <b>10-6-51</b>	PERIOD FOR WHICH MADE <b>7-16, 20, 24, 26, 27; 8-6, 9-18, 20, 10-2-51</b>	REPORT MADE BY <b>JOHN B. O'DONOGHUE dht</b>
TITLE <b>WILLIAM PERL, wa.</b>			CHARACTER OF CASE <b>ESPIONAGE - R (PERJURY)</b>

## SYNOPSIS OF FACTS:

Leave records, NACA, failed to indicate subject absent from work 7-29-44. Total leave recorded for year is twenty-two days. However, subject indicated in personnel memo he had taken twenty-eight days as of 11-9-44. July 29, 1944, a Saturday, was official work day as were all Saturdays during 1944. ROLF W. LANDAUER not known to be associated with PERL at NACA. Mrs. JOSEPH LEVINE denies any knowledge of the subject and/or Lexington Report. Investigation 2744 Mayfield Road negative.

- P -

## Details:

MAX and HELENE ELITCHER have advised they had a dinner date at the Bird-In-Hand Restaurant in New York City with the subject, JULIUS ROSENBERG, and others sometime during September, 1944. They have recently, however, come to the conclusion that this dinner engagement most probably occurred toward the end of July, 1944.

The leave records of the Bureau of Ordnance, Navy Department, Washington, D.C., reflect

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**FEDERAL BUREAU OF INVESTIGATION**

Form No. 1

THIS CASE ORIGINATED AT **NEW YORK**

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REPORT MADE AT <b>NORFOLK</b>	DATE WHEN MADE <b>11/28/51</b>	PERIOD FOR WHICH MADE <b>11/13, 19/51</b>	REPORT MADE BY <b>FRED A. COOTS</b>	<b>pgb</b>
TITLE <b>WILLIAM PERL, wa.</b>			CHARACTER OF CASE <b>ESPIONAGE - R PERJURY</b>	

**SYNOPSIS OF FACTS:**

**JOHN STACK**, Assistant Head of Research, NACA, advised that according to his review of subject's written work while at NACA, Langley Field, there would be no necessity for his knowledge of Russian language. Mr. STACK advised translators have been available to scientific personnel at NACA since 1935. Library records at NACA deemed incomplete and failed to reflect that subject had signed out any material necessitating Russian translation. Investigation fails to reflect that any USSR representatives at Langley Field during period PERL and PASS employed there.

APPROPRIATE AGENCIES  
AND FIELD OFFICES  
ADVISED BY ROUTING  
SLIP(S) OF **DECLASS**  
DATE **3-15-78** **RUC**

DECLASSIFIED BY **4913**

ON **3/14/78** **AP/jan**

**DETAILS:**

**AT HAMPTON, VIRGINIA**

**CHARLES F. BARNETT**, Security Officer, National Advisory Committee for Aeronautics, advised that according to records, there is no indication that any USSR Representatives had been at Langley Field during the period PERL and PASS were employed there. Mr. BARNETT advised that the usual procedure is to photograph all foreign visitors who might come through for inspection tours or otherwise at NACA, Langley Field.

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**R47 NOV 22 1960**

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NF 65-514

Regarding the necessity for either PERL or PASS to have a knowledge of the Russian language to assist them in any scientific or mathematical translation while employed at NACA, Langley Field, Virginia, Mr. JOHN STACK, Assistant Chief of Research, NACA, Langley Field, Virginia, advised that he could see no necessity for any of his scientific men to have a knowledge of the Russian language in assisting them in their work. Mr. STACK reviewed written papers authored by subject PERL while at Langley Field and advised that from a review of these, he could see no necessity for PERL's studying the Russian language.

Mr. STACK advised that in 1945, the National Advisory Committee for Aeronautics, Langley Field, Virginia, employed one SAMUEL REISS as a Junior Aeronautical Engineer. He stated that REISS became a full time translator on January 6, 1936 and that he has personal knowledge of REISS's ability to translate Russian. Mr. STACK stated that as is the usual procedure, if one of his scientific men wishes to have a translation made from a foreign language to English to facilitate working on a problem, the person writes a written request and if deemed advisable, the supervisory person acting on the request has a translation made of the particular work. This English translation is then catalogued and made available to any of the scientists.

Doctor H. J. E. REED, NACA, advised that translators are available to all scientific men. He stated that it is possible that PERL might have wanted to study the Russian language to assist him in his work despite the availability of translators at NACA.

Through the cooperation of CHARLES F. BARNETT, Security Officer, Miss FRANCES MORELAND, Assistant Librarian, NACA, Langley Field, Virginia, reviewed all available references that subject PERL might have used during his work at NACA, Langley Field, with the object of determining whether or not subject had obtained technical books in the Russian language. Miss MORELAND advised that her records are not reliable enough to make a definite statement. She stated that on highly classified documents, the person desiring such documents would have had to sign a form that would have been written by the library section. She stated, however, that she has found no such forms. She further advised that she could find no indication that PERL either did or did not use Russian documents that had not been translated.

- REFERRED UPON COMPLETION TO THE OFFICE OF ORIGIN -

SECURITY INFORMATION - CONFIDENTIAL

NF 65-514

ADMINISTRATIVE PAGE

It is being pointed out that the subject's work at NACA, Langley Field, Virginia, was supervised by ABE SILVERSTEIN, now of NACA, Cleveland, Ohio, and SAM KATZOFF, NACA, Langley Field, Virginia. It is further being pointed out that KATZOFF has been contacted by subject's attorney with the object of obtaining a character statement.

Unless advised to the contrary, KATZOFF will not be interviewed to assist in arriving at an answer as to whether or not subject PERL had to have knowledge of the Russian language to assist him in scientific or mathematical translations. It is further being pointed out that no lead is being set out to Cleveland to interview former superiors at Cleveland.

REFERENCE: New York letter to Bureau dated November 2, 1951.

- REFERRED UPON COMPLETION TO THE OFFICE OF ORIGIN -



# FEDERAL BUREAU OF INVESTIGATION

Form No. 1

THIS CASE ORIGINATED AT

FILE NO.

REPORT MADE AT <b>NORFOLK</b>	DATE WHEN MADE <b>11/28/51</b>	PERIOD FOR WHICH MADE <b>11/13, 19/51</b>	REPORT MADE BY <b>STANLEY, CLYDE</b>
TITLE <b>WILLIAM PERL, vs.</b>			CHARACTER OF CASE <b>ESPIONAGE - R PERJURY</b>

**SYNOPSIS OF FACTS:**

JOHN STACK, Assistant Head of Research, NACA, advised that according to his review of subject's written work while at NACA, Langley Field, there would be no necessity for his knowledge of Russian language. Mr. STACK advised translators have been available to scientific personnel at NACA since 1939. Library records at NACA deemed incomplete and failed to reflect that subject had signed out any material necessitating Russian translation. Investigation fails to reflect that any USSR representatives at Langley Field during period PERL and PERL employed there.

- REC DECLASSIFIED BY **4913**  
ON **3/14/78** **AP/Jan**

**DETAILS:**

AT HAMPTON, VIRGINIA

ON REED F. BARNETT, Security Officer, National Advisory Committee for Aeronautics, advised that according to records, there is no indication that any USSR representatives had been at Langley Field during the period PERL and PERL were employed there. Mr. BARNETT advised that the usual procedure is to photograph all foreign visitors who might come through for inspection tours or otherwise at NACA, Langley Field.

APPROVED AND FORWARDED:	SPECIAL AGENT IN CHARGE	DO NOT WRITE IN THESE SPACES	
COPIES OF THIS REPORT			
<b>5 - Bureau (65-59312)</b> <b>4 - New York (65-15387)</b> <b>2 - Norfolk (65-514)</b>			

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## Office Memorandum • UNITED STATES GOVERNMENT

TO : Director, FBI (65-59312)

DATE: March 31, 1952

FROM : SAC, Cleveland (65-1744)

SUBJECT: WILLIAM PERL, aka.  
ESPIONAGE - R  
PERJURY

ReBulet 2/25/52 and Cincinnati letter 3/7/52.

Mr. H. BURTON BRACY, Security Officer, NACA, Cleveland, was contacted concerning his memorandum dated November 15, 1951, and he advised that he has been unable to secure further information concerning the RUARK report. He stated that the three photostatic copies which had been in the possession of NACA, Cleveland, had been destroyed by him on February 7, 1952.

A check was made then at the Library of the Lewis Flight Propulsion Laboratory in an effort to further determine the dissemination of the RUARK report at Cleveland; however, no records were located which would furnish any more light than that set forth in BRACY's memo.

It is noted that referenced Bulet suggests that the records for a Library inventory might be helpful in this regard; however, Miss ETHEL LYONS has advised that these records are maintained only temporarily and are always destroyed at least by the next inventory, which is conducted within six months. This source, therefore, is not available.

Miss LYONS was questioned concerning the RUARK report; however, she was unable to recall the document and stated she did not feel that any of the librarians would be able to be of assistance unless a copy were shown to them to refresh their memories in view of the vast amount of material that they handle in their daily work.

It will be recalled that ~~ELEANOR~~ WILKINS during previous interviews has stated that she recalls handling no documents referring to nuclear energy and, in particular, nuclear propulsion of aircraft. This point in particular was stressed with Miss WILKINS during the investigation concerning the LEXINGTON report.

COPIES DESTROYED

R47 NOV 22 1960 It is felt that if further inquiry is desired in this matter at NACA, Cleveland, the Bureau should arrange to have a copy of the RUARK report furnished to the Cleveland Office in

JBO'D:CGP

RECORDED - 126

INDEXED - 126

125

65-59312-684

5 APR 9 1952

cc: Cincinnati (65-1744)

New York (65-15387) (Enc.)

Director, FBI

order that it might be presented to those persons interviewed to refresh their memories. At this point, it will of course be necessary to have the approval of the Atomic Energy Commission before this document can be handled by persons not having Atomic Energy clearance. The bulk of the librarians at NACA do not have such clearance.

Reference Cincinnati letter indicates that Mr. BERNARD BEAMAN, Chief, Nuclear Propulsion Branch, Power Plant Laboratory, Wright Field, has stated that NACA, Cleveland, advised him that no reproductions were made of the copy of the RUARK report which he furnished to NACA. As a matter of record, it is pointed out that the copy Mr. BEAMAN furnished was in fact sent to Major V. C. RETHMAN, the Air Materiel Command Liaison Officer at NACA. This apparently was not the same copy furnished to NACA, Cleveland, by Johns Hopkins Laboratory, copies of which were made at Cleveland.

\*\*\*\*\*

Reference is made to New York letter dated March 18, 1952, instructing the Cleveland Office to request the NACA Payroll Office to prepare from their records a listing on a yearly basis of all moneys paid to subject together with the breakdown as to gross pay, retirement, tax and net pay.

In view of the work load of the NACA Payroll personnel, this listing which is set forth below was prepared by the Cleveland Office from NACA records, photostats of which were forwarded to New York by letter dated February 15, 1952.

As to the question posed concerning PERL's payroll sheet dated 1946, please be advised that a review of NACA records has indicated that this is in error and in fact this sheet is for the second half of 1945. A photostatic copy of the first period for 1946 is enclosed which reflects the subject was paid \$22.41 gross less \$1.15 for one day's work on July 2, 1946.

Miss PAT CLARK, Payroll Clerk, NACA, Cleveland, advised that the sign-in register with PERL's name would have been the only necessary authorization for such pay. A complete review of PERL's personnel file was again made without locating any record of his having returned from leave without pay for these two days.

Director, FBI

Mr. H. BURTON BRACY advised he has been told that PERL was meticulous in his demands for exact payment for work performed and, further, stated that he will check further into this matter to ascertain the reason for PERL's being paid for these two days.

Reference New York letter also indicates that the New York Office has conducted considerable investigation in an attempt to determine PERL's activities and whereabouts during the summer of 1946. Although Cleveland is not in possession of the New York AEA report on PERL which covered the verification of his Columbia University education, it has in the past been PERL's contention that he attended Columbia University during the summer of 1946. It would be appreciated if the New York Office would advise the exact date when PERL entered Columbia in 1946 in order that further investigation may be conducted at Cleveland if necessary. You will be advised of the results of the investigation concerning PERL's working during June and July, 1946, at NACA.

The following is a summary of payments made to WILLIAM PERL by NACA, Cleveland:

DATE	GROSS	RETIREMENT	TAX		NET
1939	\$1,461.05	\$51.20			\$1,409.85
1940	\$2,108.21	\$73.85			\$2,034.36
1941	\$2,499.90	\$87.66			\$2,412.24
1942	\$2,940.71	\$126.47			\$2,814.24

DATE	GROSS	RETIREMENT	TAX	BONDS	NET
1943	\$4,103.24	\$173.83	\$428.80	\$712.50	\$2,788.11
1944	\$4,455.42	\$190.08	\$730.23	\$662.50	\$2,872.61
1945	\$4,911.49	\$224.70	\$728.69	\$800.00	\$3,158.10
1946	\$2,635.11	\$131.88	\$308.10	\$75.00	\$2,120.13

Director, FBI

DATE	GROSS	RETIREMENT	TAX	BONDS	NET
1947	Nothing				
1948	\$3,936.51	\$228.38	\$426.40		\$3,281.73
1949	\$8,004.23	\$480.51	\$895.70		\$6,628.12
1950	\$6,955.38	\$385.89	\$798.17		\$5,771.32

A review of the file reflected that PERL was paid \$524.64 less \$79.97 tax in lieu of accrued annual leave and \$2,148.52 which was his contribution to the retirement fund.

Cleveland, Ohio  
January 4, 1950

MEMO, SAC

Re: WILLIAM PERL, aka.  
ESPIONAGE - R

*70*  
*Rec'd 12/15, 16, 19, 28*  
*1/20, 10*

Re Memo SAC of SA ARTHUR W. PEJEAU, 12/9/50, Bureau teletype to Cleveland 12/15/50, and New York teletype to Cleveland 12/16/50.

The following investigation was conducted by SAs THOMAS A. MAKI and EDWIN B. BIRNEY, and is a summary of the results of the investigation furnished to the Bureau and New York by teletypes dated December 20, 1950 and January 3, 1951.

On December 15, 1950 JACK BROWN, Personnel Manager, NACA, Cleveland, furnished the following information regarding ELEANORE E. WILKINS to SA MAKI:

Born:  
Sister:

August 23, 1918, Kansas City, Missouri  
BOHETTE A. WILKINS, Maple Springs,  
New York, telephone Bemus Point 3006  
(present address 1615 Mars Avenue,  
Lakewood, Ohio

Former address:  
Education:

1518 Ansel Road, Cleveland, August, 1947  
Webster Grove, Missouri High School  
Washington University, St. Louis,  
BA in English 1936-1940  
Carnegie Library School, Pittsburgh,  
Pennsylvania 1941-1942, BS in Library  
Science

Employments:

Carnegie Library, Pittsburgh, 1942-1944  
War Department, Air Force, Eglin Field,  
Florida, March, 1944 to February, 1946  
Carnegie Library, Pittsburgh, February,  
1946 to June, 1946  
June, 1946 to December, 1946 "Travelled"  
Cleveland Public Library, Cleveland,  
Ohio, January, 1947 to August, 1947  
NACA, August, 1947 to present.  
Classified as Librarian GS-7, Salary  
\$3950. Last rating "Excellent".

*mak*  
EEB:mak  
65-2730

cc 65-2726

*one*  
*As. index*  
*all pp. of*

65-2730-394

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SERIALIZED	FILED
JAN 4 1951	
FBI - CLEVELAND	

*O'Donoghue*



MEMO, SAC

References:

HAZEL KING, American Gas Association,  
420 Lexington Avenue, New York City.  
Met while at Eglin Field, Florida.  
MARTHA BARNES, Instructor of WILKINS  
at Carnegie Library.  
FRANCIS KELLEY, 4400 Forbes Street,  
Pittsburgh, Pennsylvania, Head of  
library school.

Mr. BROWN furnished a photograph of ELEANORE WILKINS which is being retained in the 1A jacket of subject's file.

On December 16, 1950 IVA BALDWIN, Assistant Manager, Evangeline Residence, 1518 Ansel Road, Cleveland, advised SA MAKI that ELEANORE E. WILKINS resided at the Evangeline Residence from January 26, 1947 to November 17, 1948. She was employed as of January 22, 1947 by the Business Information Bureau of Cleveland Public Library. Her parents resided at Library, Pennsylvania. Her father, O. L. WILKINS, died early in 1948 after which ELEANORE WILKINS endeavored to locate a home for her sister and mother. ELEANORE WILKINS subsequently resided at 1615 Mars Avenue, Lakewood, Ohio. Her former roommate and associate was one KATHLEEN BOLDT, residence c/o W. S. LEAPER, Landerwood Drive, ED #4, Chagrin Falls, Ohio, employed Willcraft Paper Company, 1927 East 19th Street, Cleveland. References EDITH CASE and ROSE BORNHILLER, both employees of the Cleveland Public Library. Miss BALDWIN stated that due to the illness of the father of ELEANORE WILKINS, Miss WILKINS frequently visited her home in Library, Pennsylvania.

WALTER ORE, Information Officer, NACA, Cleveland, residence apartment house on the Northwest Corner, 30th and Euclid Avenue, advised that he had been informed by JOSEPHINE CASE his secretary, that WILLIAM PERL and ELEANORE WILKINS were frequently seen at lunch together at NACA.

ETHEL V. LYONS, Chief Librarian, NACA, residence 375 1/2 Riverdale, Rocky River, Ohio, residence telephone LA 1-0585, advised that she had first met ELEANORE WILKINS, Assistant Librarian, NACA, at the Cleveland Public Library in 1947 and associated closely with WILKINS since August, 1947 when WILKINS obtained her present position with NACA. Miss LYONS stated she believed that WILKINS had obtained her position at NACA through one PHYLLIS SNYDER, formerly Chief Librarian, NACA. PHYLLIS SNYDER upon leaving NACA, went to Columbia University to obtain a library degree and then accepted a position as a County Librarian in Fresno, California. PHYLLIS SNYDER is presently believed to be employed by the State of North Carolina as a librarian, possibly in public relations work. Miss LYONS stated that WILKINS was a conservative intellectual and a restless person who was not too happy, and that WILKINS desired to attend Columbia

MEMO, SAC

University to obtain an advanced degree in Library Science.

Miss LYONS stated that the sister and mother of ELEANORE WILKINS came to Cleveland for a short time in the Fall of 1947 or 1948 and then moved to a cottage near Chautauqua Lake, New York and that WILKINS' sister had worked during that time at Jamestown, New York. The mother and sister of WILKINS then returned to Cleveland about November 1, 1950. WILKINS resided at 1615 Mars Avenue, Lakewood with one JEAN SMITH SINETSKY who was formerly a library assistant at NACA until October, 1950. JEAN SMITH SINETSKY, according to Miss LYONS, is presently employed in New York City by the Public Library, and is seeking a position with the Kellax Company, an AEC facility in New York.

Miss LYONS stated that she had observed PERL and WILKINS together many times in the NACA Library and that WILKINS was very attentive to PERL and would "beat the cars off any girl who wanted to wait on him". Miss LYONS stated she had no information regarding the association of PERL and WILKINS outside of the NACA Library.

Miss LYONS stated that WILKINS had been considering attending Columbia University and seeking a job in the New York area, and that WILKINS was interested in obtaining a U. S. Fulbright Scholarship for study in a foreign school. Miss LYONS stated that WILKINS has not been "cleared" and does not have access to "secret" material or "classified AEC" material but does have access to "confidential" and "restricted" material.

Miss LYONS commented that WILLIAM PERL was like a "pack rat" in accumulating documents from the NACA Library and that some of the material apparently had not been charged out, and that they had some difficulty in having it returned.

Miss LYONS furnished the names of the following library assistants presently employed at NACA:

Mrs. ELEANOR SCADDINO

Mrs. EVELYN DALZELL

Miss MARGARET MITCHELL

Miss JOANNE FOLE

Miss BARBARA BACON

Mrs. MARGARET NEIDENGARD

MEMO, SAC

Miss KATHLEEN BOLDT, employed at Millcraft Paper Company, 1927 East 19th Street, Cleveland, was interviewed on December 19, 1950. She stated that she had been a roommate of ELEANORE WILKINS for more than a year at the Evangeline beginning January, 1947, and that WILKINS had been a close friend of one Miss CROOKSTON who had formerly worked with WILKINS at the Cleveland Public Library. Miss CROOKSTON is presently employed by Meldrum & Fewsmith, Carnegie Hall Building, Cleveland, Ohio.

Miss BOLDT stated that WILKINS "dated" PERL occasionally and admired PERL very much. She stated that WILKINS was very close about her personal affairs but that she used to speak about PERL in connection with her work at the NACA Library and stated that she always endeavored to find the material that PERL desired in the NACA Library. Miss BOLDT stated that WILKINS on her recent trip to New York found that she could not afford the Library Science course that she wanted to take at Columbia University but that since her return to Cleveland has received "some sort of offer". WILKINS is also considering attending Western Reserve University in Cleveland. WILKINS reportedly attended a number of "lectures" while in New York. Miss BOLDT stated that WILKINS, during the first year she had known her, visited her mother and sister in Library, Pennsylvania but that her mother and sister now reside with WILKINS on Mars Avenue in Lakewood, Ohio.

On January 3, 1951 Miss BOLDT advised that on Christmas Eve, 1950, WILKINS had informed her that she had seen PERL on her recent trip to New York and that PERL had informed her that he had recently remarried his former wife.

The Cleveland indices contained no information regarding ELEANORE E. WILKINS, PHYLLIS SNYDER, or JEAN SMITH SINETSKY.

The following descriptive information regarding ELEANORE E. WILKINS was obtained from the records of NACA and the Evangeline Residence:

Born:	August 23, 1918, Kansas City, Missouri
Residence:	1615 Mars Avenue, Lakewood, (1950)
Previous residences:	1518 Ansel Road, August, 1947 The Evangeline, 1588 Ansel Road - January 26, 1947 to November 17, 1948
Race:	White
Sex:	Female
Height:	5' 10"
Weight:	130 pounds
Hair:	Dark brown
Characteristics:	Low forehead; rimless glasses; fracture of right ankle at age 15; slight limp

MEMO, SAC

Religion:  
Occupation:  
Relatives: Sister:

Father:

Education:

Employments:

References:

Presbyterian  
Librarian

BOBETTE A. WILKINS, Maple Springs, New York, Phone Bemus Point 3006

O. L. WILKINS, Library, Pennsylvania  
died early 1948

Webster Grove, Missouri High School  
1936-1940 Washington University, St. Louis, BA English

1941-1942 Carnegie Library School,  
Pittsburgh, Pennsylvania, BS Library Science

1942-1944 Carnegie Library, Pittsburgh  
3/44-2/46 War Department, Air Force,  
Eglin Field, Florida

2/46-6/46 Carnegie Library

6/46-12/46 "Travelled"

1/47-8/47 Cleveland Public Library,  
Business Information Bureau, began  
1/22/47

8/47 to present NACA, Librarian

HAZEL KING, American Gas Association,  
420 Lexington Avenue, New York.

Excellent while at Eglin Field, Florida

MARTHA BARNES, Instructor at Carnegie  
Library

FRANCIS KELLEY, 14400 Forbes Street,  
Pittsburgh, Head of Library School

KATHLEEN BOLDT, c/o. W. S. LEAPER,  
Landerwood Drive, Route 4, Chagrin  
Falls, Ohio, Employed Millcraft Paper  
Company, 1927 East 19th Street

EDITH CASE, Cleveland Public Library

ROSE VORMELLER, Cleveland Public Library

Photograph of ELEANORE WILKINS in 1-A jacket of subject's file.

EDWIN B. HIRNEY  
SA

Cleveland, Ohio  
February 27, 1951

MEMO, SAC:

RE: WILLIAM PERL, wa.  
ESPIONAGE - R

Re: XP - 81

In attempting to establish that PERL had access to a memo dated February 1, 1944, at Santa Monica, California, written by EDWIN P. HARTMAN, West Coast Representative, N.A.C.A., the following were interviewed:

ETHEL V. LYON, Chief Librarian, N.A.C.A., personally made a thorough search of the N.A.C.A. Library and was unable to find a copy of HARTMAN'S memo. She did, however, locate several memos pertaining to the XP-81 among them a letter written by HARTMAN; however, all of this material was dated 1945 and later. *E. Lyon*

CARLTON KEMPER, Executive Engineer, Office of Chief of Research, advised that HARTMAN'S memo was sent to him from Washington Headquarters in February, 1944, and was signed for by his ex-secretary, Mrs. ALMIRA ELLIOTT, now deceased. According to KEMPER, she died in 1949 of cancer. KEMPER recalled after viewing the memo that upon receipt of it he sent it directly to the Altitude Wind Tunnel and most probably to AL YOUNG, who is now in charge of one branch of the Altitude Wind Tunnel. KEMPER recalled that complete arrangements were made for testing the power plant of the XP-81 but no actual work was done.

AL W. YOUNG was interviewed and advised that he vaguely recalled the preparations for testing the power plant of the XP-81. He stated that in 1944 the Altitude Wind Tunnel was headed by ABE SILVERSTEIN and all documents which came to YOUNG would have to clear through SILVERSTEIN. He stated he had no knowledge of PERL'S being involved in the preliminary work on the XP-81 but stated that PERL was quite close to SILVERSTEIN and could have had knowledge of it. He stated he was positive PERL worked on the

JBO'D:GUP *eap*  
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FBI - CLEVELAND	



MEMO, SAC:

[ preliminary plans for testing the XP-92 and recalled that all data were cleared through SILVERSTEIN on that plane also. It is to be noted that PERL has denied any knowledge of any Vultee aircraft. The XP-92 is a Vultee plane. YOUNG also stated that the XP-81 project was assigned to G. MERRITT PRESTON, who is now in the Flight Plans Room, 201 Flight Research Section, PAX telephone 4271.

It will be recalled that SILVERSTEIN in an interview with the writer advised he recalled the preparations for testing the XP-81 and was quite certain that PERL had nothing to do with it.

JOHN B. O'DONOGHUE  
SA



SAC, NEW YORK

January 17, 1952

~~CONFIDENTIAL~~

DIRECTOR, FBI

RECORDED - 41

WILLIAM PERL, aka William Mutterperl (Bufile 65-59312)  
ESPIONAGE - R; PERJURY (NY 65-15387)

EX-83

[REDACTED] (b)(1)

(Bufile 100-360455)

[REDACTED]

[REDACTED]

Enclosure

cc: Washington Field (Enclosure) (65-5543)  
Los Angeles (Enclosure) (65-5075)  
Buffalo (Enclosure) (65-2003)  
Cleveland (Enclosure) (65-2730)

KFE:hc

Classified by 49/3 API/LL  
Exempt from GDS, Category 2-S  
Date of Declassification Indefinite  
3-14-78

65-59312-650

JAN 17 1952  
COMM - FBI

~~CONFIDENTIAL~~

80 FEB 15 1952

UNRECORDED COPY FILED IN 100-360455

HERBIE C. NEWSAPER, SC. D. CHIEF  
ALEXANDER WETMORE, PH. D. VICE

DETLEV W. BRONKH, PH. D.  
VICE ADM. JOHN M. CASSADY, U. S. N.  
EDWARD U. CYNDOR, SC. D.  
MON. THOMAS W. S. DAVIS  
JAMES H. DOOLITTLE, SC. D.  
RONALD H. HAZEN, SC. D.  
WILLIAM LITTLEWOOD, SC. D.  
REAR ADM. THEODORE C. LORING, U. S. N.

MON. DONALD W. PATTISON  
MAJ. GEN. DONALD L. PUTY, U. S. A. F.  
ARTHUR E. RAYMOND, SC. D.  
FRANCIS W. REICHELDERFER, SC. D.  
MAJ. GEN. GORDON F. SAVILLE, U. S. A. F.  
WILLIAM WEBSTER, SC. D.  
THEODORE F. WRIGHT, SC. D.

# NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

1724 F STREET, NORTHWEST  
WASHINGTON 25, D. C.

TELEPHONE: LIBERTY 8-6700

LANGLEY AERONAUTICAL LABORATORY  
LANGLEY FIELD, VA.

AMES AERONAUTICAL LABORATORY  
MUSSETT FIELD, CALIF.

LEWIS FLIGHT PROPULSION LABORATORY  
CLEVELAND AIRPORT, CLEVELAND 11, OHIO

January 8, 1932

Mr. John Edgar Hoover  
Director, Federal Bureau  
of Investigation  
U. S. Department of Justice  
Washington 25, D. C.

Subject: William Perl aka  
William Muttperl  
Espionage - R  
Perjury  
FBI file No. 65-59312

Dear Sir:

Reference is made to your letter of  
December 5, 1931.

I am transmitting herewith a translation  
of the Russian notes forwarded to NACA as an  
enclosure to your letter. Since the enclosed  
translation was made by one familiar with  
aeronautical terms, it may supplement the  
translation available to you.

Very truly yours,

Robert L. Bell  
Robert L. Bell  
Security Officer

Enclosure

EXPEDITE PROCESSING  
JAN 9 1932

Let J. H. C. acc.  
P. 1-17-32  
c/c

2  
41  
65-59312

RECORDED - 41  
INDEXED - 41  
EX-83

65-59312-650

[REDACTED]

[REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED]

(b)(4)

ENCLOSURE

65-59312-650

**SECRET**

Security Information

**Security Information**

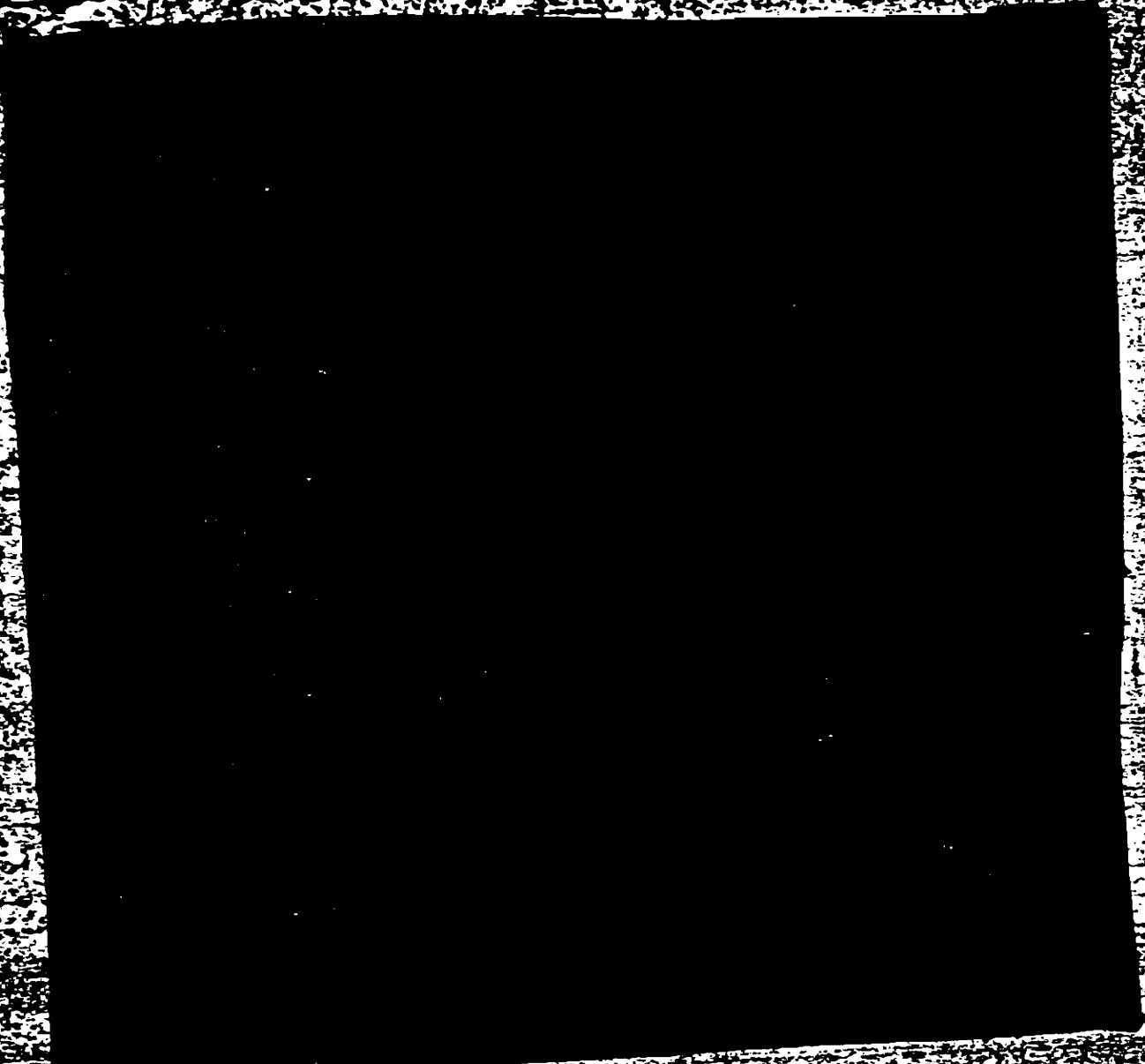
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Security Information

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Security Information

DECLASSIFIED WHEN  
CLOSURES ARE DETERMINED

MR. DONALD W. BOB  
MAJ. GEN. DONALD L. PUTT, U. S. A. F.  
ARTHUR E. RAYMOND, SC. D.  
FRANCIS W. REICHELDERFER, SC. D.  
MAJ. GEN. GORDON P. SAVILLE, U. S. A. F.  
WILLIAM WEBSTER, M. S.  
THEODORE P. WRIGHT, SC. D.

1724 F STREET, NORTHWEST  
WASHINGTON 25, D. C.

LEWIS FLIGHT PROPULSION LABORATORY  
CLEVELAND AIRPORT, CLEVELAND 17, OHIO

TELEPHONE: LIBERTY 9-6700

**February 5, 1952**

**Dear Sir:**

In response to the oral request of Special Agent Elmer Emrich, I am enclosing a copy of a memorandum dated June 15, 1945, from the Langley Laboratory Security Officer for the Engineer-in-Charge.

This memorandum concerns the loss of a Secret document entitled "Guided Missiles - Development, Status, and Availability."

Very truly yours,

Robert L. Bell  
Security Officer

**Enclosure**

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EX-164

59 MAR 11 1952

~~FEB 22~~ 1952

65-39312-668



Julius Rosenberg Et Al.

Referral  
National  
Aeronautics  
And Space  
Administration

No. 18

MR. MILES WAGGONER  
FREEDOM OF INFORMATION OFFICER  
NASA  
WASHINGTON, D.C. 20546

REFERRAL

Reviewed by: BAK/GER

AGENCY NASA

PACKET 18

Subject and File Number		Serial	Date	Document Description	No. of Pages Actual Released	
1	WM. PERL (HQ) 65-59312	481	7/12/51	CLEVELAND LETTER TO HQ W/ENCLOSURES	1/99	1/99
2	WM. PERL (HQ) 65-59312	481	7/27/51	HQ LETTER TO SAC, CLEVELAND.	5	5
3	WM. PERL (HQ) 65-59312	EBF 939	7/14/51	LAB REPORT W/ENCLOSURES	2/100	2/100
4						
5						
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7						
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10						
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12						

## Office Memorandum • UNITED STATES GOVERNMENT

TO : Director, FBI ATTENTION MECHANICAL DIVISION DATE: July 12, 1951

FROM : SAC, Cleveland

AIR MAIL SPECIAL DELIVERY (RMRRR)

SUBJECT: [REDACTED] [TS] b1

~~TOP SECRET~~  
STRICTLY CONFIDENTIALWILLIAM PERL, aka.  
ESPIONAGE - R; PERJURY  
(Bufile 65-59312)

Rebulet dated 6/19/51.

134780

There are enclosed herewith the original letter from the Army Air Force dated August 4, 1944 concerning research on pilotless guided missiles; two copies of letter dated August 16, 1944 from NACA, Washington, to NACA, Cleveland, authorizing research on said missiles; and copies of research authorization number E-110. In addition there is enclosed a folder entitled "Ram Jet Conferences Minutes," which includes the minutes of such conferences from July 24, 1944 through April 13, 1945 inclusive.

No record could be located in NACA files concerning the JB-2 bomb; however, a thorough search of Ram Jet material revealed the enclosed conference minutes and letters described above. It will be noted that these minutes are primarily concerned with the construction of robot bombs and would indicate WILLIAM PERL was well aware of all research being conducted in that field.

~~EXPEDITE PROCESSING~~

It is requested that the Bureau photograph or photostat the enclosed material and furnish copies to the New York and Cleveland Divisions as well as retain a copy for Bureau files. It is pointed out that the minutes of July 24, 1944 include calculations and curves on Ram Jet studies which were prepared by WILLIAM PERL and Mr. L. RICHARD TURNER. The handwritten analyses appear to be in PERL's handwriting and it is suggested therefore the Bureau may desire photographs of this section in the event it is more feasible to photostat the entire minutes.

ENCLOSURE: [REDACTED] out that the enclosed material has been loaned to this office and it is therefore desired that it be returned as quickly as possible.

SLIP(S) OF

DATE 2/16/51

JBO:pjf  
65-2730cc: Bufile 65-59543  
2 New York (65-15387)  
Cv file 65-2726  
65-2751

Enc. (RMRRR)

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INDEX OF FILES

Secret

Classified by 4913  
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Date of Declassification Indefinite  
65-59312-481

UNRECORDED COPY FILED IN 65-59312-481

Final Preliminary Design Study of  
Development of Special Vehicle  
for Army Air Forces

Approved by the Air Force  
April 1947

Issued August 1947

In accordance with authority of Executive Committee, War Relocation Authority  
Purpose of Investigation (Why?)

To cooperate with the Army Air Forces in the development  
of a vehicle meeting special Army requirements

Brief Summary of Findings (How?)

Preliminary design studies will be made of possible  
vehicles and propulsion systems to accomplish the per-  
formance requested by the Army Air Forces

Requested by the Army Air Forces, Chief of Command  
Wentworth Field, Dayton, Ohio, Department 50,  
Wright Field, Dayton, Ohio

Date of Report

Completed



AERL

~~SECRET~~

Washington, D.C.  
August 17, 1944

From NACA  
To: Cleveland

Subject: Development of guided missile for Army  
Air Forces

Reference: NACA letter of August 16, 1944, REL:lin

1. There are forwarded herewith six copies of the research authorization to cover the preparation of design studies for the subject investigation. Research authorization No. E-110 has been assigned for this project.

2. Research Authorizations Nos. E-111 and E-112 have been reserved to cover the construction of experimental models and the tests of such models respectively. It was considered that this work should be done under three separate research authorizations because of the broad scope of the request of the Army Air Forces.

3. It is requested that following the submission of preliminary design studies to the Army Air Forces for review, the laboratory submit drafts of research authorizations to cover the construction and testing phases of this project. It is requested that these drafts be in this office by September 5, if possible.

*[Signature]*  
H. V. Lewis,  
Director of  
Aeronautical Research.

REL:lin

~~SECRET~~

~~SECRET~~

Washington, D. C.  
August 27, 1944

From: SAC  
To: Cleveland

Subject: Development of Guided Missiles for Army  
Air Forces

Reference: SAC's letter of August 16, 1944, and 61

1. There are forwarded herewith all copies of  
the research authorization to cover the preparation  
of design studies for the subject investigation. An  
research authorization No. 2-116 has been assigned to  
this project.

2. Research Authorizations Nos. 1-111 and 2-112  
have been reserved to cover the construction of experi-  
mental models and the tests of such models respectively.  
It was considered that this work should be done under  
three separate research authorizations because of the  
broad scope of the request of the Army Air Forces.

3. It is requested that following the submission  
of preliminary design studies to the Army Air Forces  
for review, the laboratory submit drafts of research  
authorizations to cover the construction and testing  
phases of this project. It is requested that these  
drafts be in this office by September 5, if possible.

W. H. Lewis,  
Director of  
Aeronautical Research

Enc.

RKL:ln

~~SECRET~~



RESEARCH AUTHORIZATION

Title: Preliminary Design Study in Development of Special Vehicle for Army Air Forces

Approved: \_\_\_\_\_

Date: \_\_\_\_\_

\_\_\_\_\_

Issued: \_\_\_\_\_ August 17, 1944 \_\_\_\_\_

\_\_\_\_\_

In accordance with the authority of Executive Committee March 9, 1942

Purpose of Authorization (Why?)

Cooperate with the Army Air Forces in the development of a vehicle meeting special Army requirements.

Brief description of method (How?)

Preliminary design studies will be made of possible vehicles and propulsion systems to accomplish the performance requested by the Army Air Forces.

Remarks: Requested by the Army Air Forces, Materiel Command, in letter dated August 1, 1944, Reference Department 50, Wright Field, Dayton, Ohio.

Date of report: \_\_\_\_\_

Publication: \_\_\_\_\_

Form: \_\_\_\_\_



**The Preliminary Design Study in Development of Special Vehicle for Army Air Forces**

**Abstract**

Issued August 7, 1945 D. I. 121

In accordance with authority of Executive Committee, March 1945

**Purpose of investigation (Why?)**

To cooperate with the Army Air Forces in the development of a vehicle meeting special Army Air Forces needs.

**Brief description of method (How?)**

Preliminary design studies will be made of possible vehicles and propulsion systems to accomplish the performance required by the Army Air Forces.

Requested by the Army Air Forces Materiel Command, a letter dated August 1, 1945, reference Department of Wright Field, Dayton, Ohio.

Dated on 6

Publication 5

Complete



RESEARCH DIVISION

516

# **Preliminary Design Study in U.S. Army Air Forces for Development of Special Vehicle**

Approved

Date

Issued

August 17, 1944

100101

Director of Aeronautics, American

In accordance with authority of Executive Committee March 9, 1942

Purpose of investigation (Why?)

To cooperate with the Army Air Forces in the development of a vehicle meeting special Army requirements.

Brief description of method (How?)

Preliminary design studies will be made of possible vehicles and propulsion systems to accomplish the performance requested by the Army Air Forces.

Requested by the Army Air Forces, Materiel Command, in letter dated August 1, 1944, reference Department 50, Wright Field, Dayton, Ohio.

Date of report

Publication

Complete



RESEARCH AUTHORIZATION

Final Preliminary Design Study in  
Development of Special Vehicle  
for Army Air Forces

Naval Research Laboratory

Issued August 17, 1944

NA-466

Director of Aeronautical Research

In accordance with authority of Executive Committee, March 19, 1942

Purpose of investigation (Why?)

To cooperate with the Army Air Forces in the development  
of a vehicle meeting special Army requirements

Brief description of method (How?)

Preliminary design studies will be made of possible  
vehicles and propulsion systems to accomplish the per-  
formance requested by the Army Air Forces.

Remarks: Requested by the Army Air Forces, Material Command, in  
letter dated August 4, 1944, reference Department 50,  
Wright Field, Dayton, Ohio.

Date of report: \_\_\_\_\_

Form 10-18

CONFIDENTIAL - INVESTIGATION SECRET



# AERL

UNITED AIRLINES  
 INLAND CITY CENTER  
 1000 10th St. N. W.  
 Minneapolis, Minn. 55403

August 31, 1949

TO: National Advisory Commission on Aeronautics  
FROM: Cleveland

Letter dated August 17, 1944 transmitting Research Authorization No. E-110 entitled "Preliminary Design Study in Development of Bessell Vehicle for Army Air Force".

*(The following text is written in cursive script)*

Document

It is understood that the document covered by this receipt contains information affecting the national defense of the United States within the meaning of the Espionage Act, (USC 50-31 and 32), and the responsibility is assumed for the safe handling, storage, and transmittal elsewhere of this document in accordance with security regulations.

## Signed

**DATE**

# 1. Introduction

The Committee held the second open change room at 11:00 a.m. on 7/21/2011 from 11:30 a.m. to 12:00 p.m.

1. George, John  
 2. John, Michael  
 3. Richard, John  
 4. Silver, John  
 5. Robert, John  
 6. John, John  
 7. John, John  
 8. John, John  
 9. John, John  
 10. John, John

Major Jacob, disclosed the robot bomb was made by the Germans. A detailed description was given of the bomb and its construction as well as a general description of the robot bomb and its use. He stated that the robot bomb was extremely simple but that the controls were very complicated. He stated that the robot bomb was equipped with electrical, pneumatic, and hydraulic type controls. The design and construction of the controls are excellent, indicating considerable effort by the Germans in this phase. In contrast with the extremely simple basic construction of the robot bomb, a general impression of the very poor construction used in the making of the robot bomb by the Germans.

2. The runner and its outboard propeller drives on performance in efficiency based on theoretical calculations for the internal and external types of ram jets. The analysis from the theoretical calculations indicates that the internal view jet is capable of higher efficiency than the standard type up to a range of 900 miles per hour.

13. Mr. Jacoby brought up the question of possible use of ram-jet units and what line of attack should be followed in the laboratory research on the ram-jet unit as a power plant. Suggesting uses of the ram-jet unit were (a) assisted take-off, (b) long range projectiles, and (c) use as a primary power plant. It was agreed that ram-jet unit should be considered as power plant for the laboratory and as such should be thoroughly explored by the laboratory.

Mr. Johnson said that in assembling several valve designs that had occurred to them, it was possible that ram jet might be discussing these valve designs. Mr. Jacobs pointed out that if the automatic valves are driven very fast, the fundamental advantage of simplicity of the ram jet might be lost to some extent. It was agreed that the first theoretical flow ram jet engine to be considered should have automatic inlet valves and no air valves. Inlet valves and inlet valves involving valve drive systems would be considered later. It was decided that the laboratory should proceed with the design and

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15. Mr. G. J. McGinnis, on the same day, was directed to call attention to the fact that the first problem to be attacked is the design of the automatic control valve. Members of the group were requested to work on this problem during the following week and submit their designs for the next meeting. In summary, the following items for inclusion in the minutes of the meeting for consideration are proposed: 1. The design of automatic valves that will allow filling the combustion chamber at a high pressure and clearing the combustion chamber of spent gases between cycles.

Training meeting and lunch at 3:00 p.m.

Figure 1. The effect of the number of trials on the mean number of correct responses for the 100 trials condition. The number of correct responses was significantly higher than the number of incorrect responses for all conditions.

SECRET  
JAMES H. KENNEDY  
CONFIDENTIAL  
SECRETARY, HOUSE OF REPRESENTATIVES

1998年12月15日

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20. 10/10/10

1)  $\frac{1}{x^2} = x^{-2}$   
 $\frac{d}{dx} x^{-2} = -2x^{-3} = -\frac{2}{x^3}$

$$1) \frac{d}{dx} \left( \frac{1}{x^2} \right) = -\frac{2}{x^3}$$

2)  $\frac{d}{dx} \left( \frac{1}{x^3} \right) = -\frac{3}{x^4}$   
 $\frac{d}{dx} \left( \frac{1}{x^4} \right) = -\frac{4}{x^5}$   
 $\frac{d}{dx} \left( \frac{1}{x^5} \right) = -\frac{5}{x^6}$

$$2) \frac{d}{dx} \left( \frac{1}{x^3} \right) = -\frac{3}{x^4}$$

3)  $\frac{d}{dx} \left( \frac{1}{x^4} \right) = -\frac{4}{x^5}$   
 $\frac{d}{dx} \left( \frac{1}{x^5} \right) = -\frac{5}{x^6}$

4)  $\frac{d}{dx} \left( \frac{1}{x^6} \right) = -\frac{6}{x^7}$   
 $\frac{d}{dx} \left( \frac{1}{x^7} \right) = -\frac{7}{x^8}$

5)  $\frac{d}{dx} \left( \frac{1}{x^8} \right) = -\frac{8}{x^9}$   
 $\frac{d}{dx} \left( \frac{1}{x^9} \right) = -\frac{9}{x^{10}}$

$$5) \frac{d}{dx} \left( \frac{1}{x^8} \right) = -\frac{8}{x^9}$$





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*[The page contains faint, illegible markings.]*

17th March 1946	17th March 1946
18th March 1946	18th March 1946
19th March 1946	19th March 1946
20th March 1946	20th March 1946
21st March 1946	21st March 1946
22nd March 1946	22nd March 1946
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27th March 1946	27th March 1946
28th March 1946	28th March 1946
29th March 1946	29th March 1946
30th March 1946	30th March 1946
31st March 1946	31st March 1946

10-24-2014  
 10-25-2014

Dear Mother  
 I hope you are well and happy. I am  
 well and happy. I hope you are well and happy.

Handwritten: Handwritten:

*[Faint, illegible handwriting across the page]*

1980年1月  
 1980年1月

[illegible]

2) The same experiment was conducted

<i>S. aureus</i>	<i>A. baumannii</i>	<i>B. subtilis</i>
(A)	(B)	(C)
<i>A. R.</i>	<i>T. P.</i>	<i>P. S.</i>

1. What is the purpose of the study?  
 The purpose of the study is to investigate the effect of the use of a mobile learning application on the learning outcomes of students in the field of mathematics.

\_\_\_\_\_



[illegible]

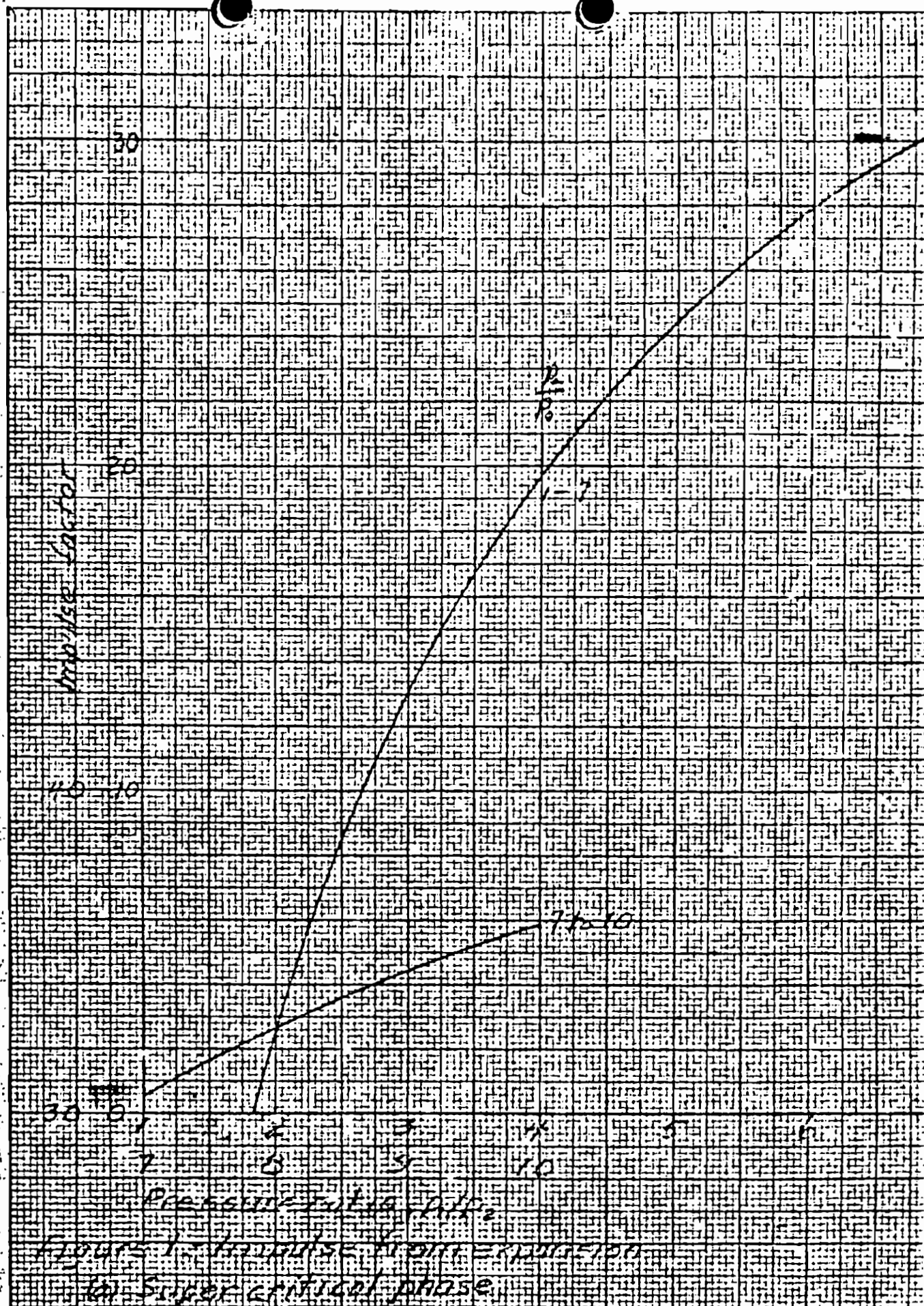
PL. 50. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 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Figure 2. The line graph shows the concentration of the solution (the y-axis) versus the volume of the solution (the x-axis). The concentration of the solution increases as the volume of the solution increases. The concentration of the solution is 1.0 M at 1.0 L, 2.0 M at 2.0 L, 3.0 M at 3.0 L, 4.0 M at 4.0 L, 5.0 M at 5.0 L, 6.0 M at 6.0 L, 7.0 M at 7.0 L, 8.0 M at 8.0 L, 9.0 M at 9.0 L, and 10.0 M at 10.0 L.

The graph shows that the concentration of the solution is directly proportional to the volume of the solution. This is because the concentration of the solution is 1.0 M at 1.0 L, 2.0 M at 2.0 L, 3.0 M at 3.0 L, 4.0 M at 4.0 L, 5.0 M at 5.0 L, 6.0 M at 6.0 L, 7.0 M at 7.0 L, 8.0 M at 8.0 L, 9.0 M at 9.0 L, and 10.0 M at 10.0 L.

KUPTEL & ISSER CO., M. P. NO. 38-11  
 10 X 10 to the 6 inch, 10 inch covered  
 MADE IN U.S.A.



Pressure ratio  $P_2/P_1$   
 Temperature ratio  $T_2/T_1$   
 Super critical phase



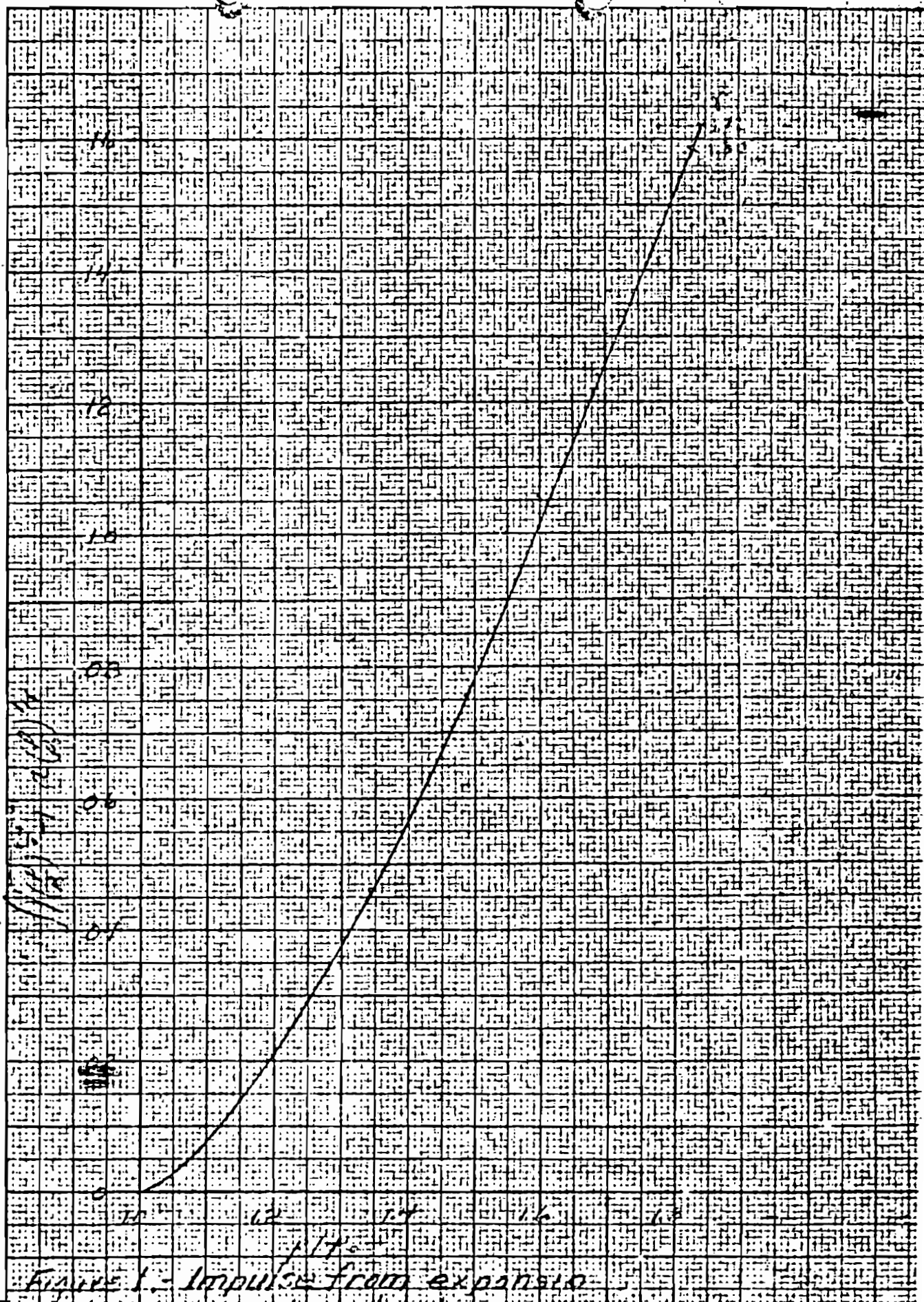


Figure 1 - Impulse from expansion

(K<sub>1</sub>)

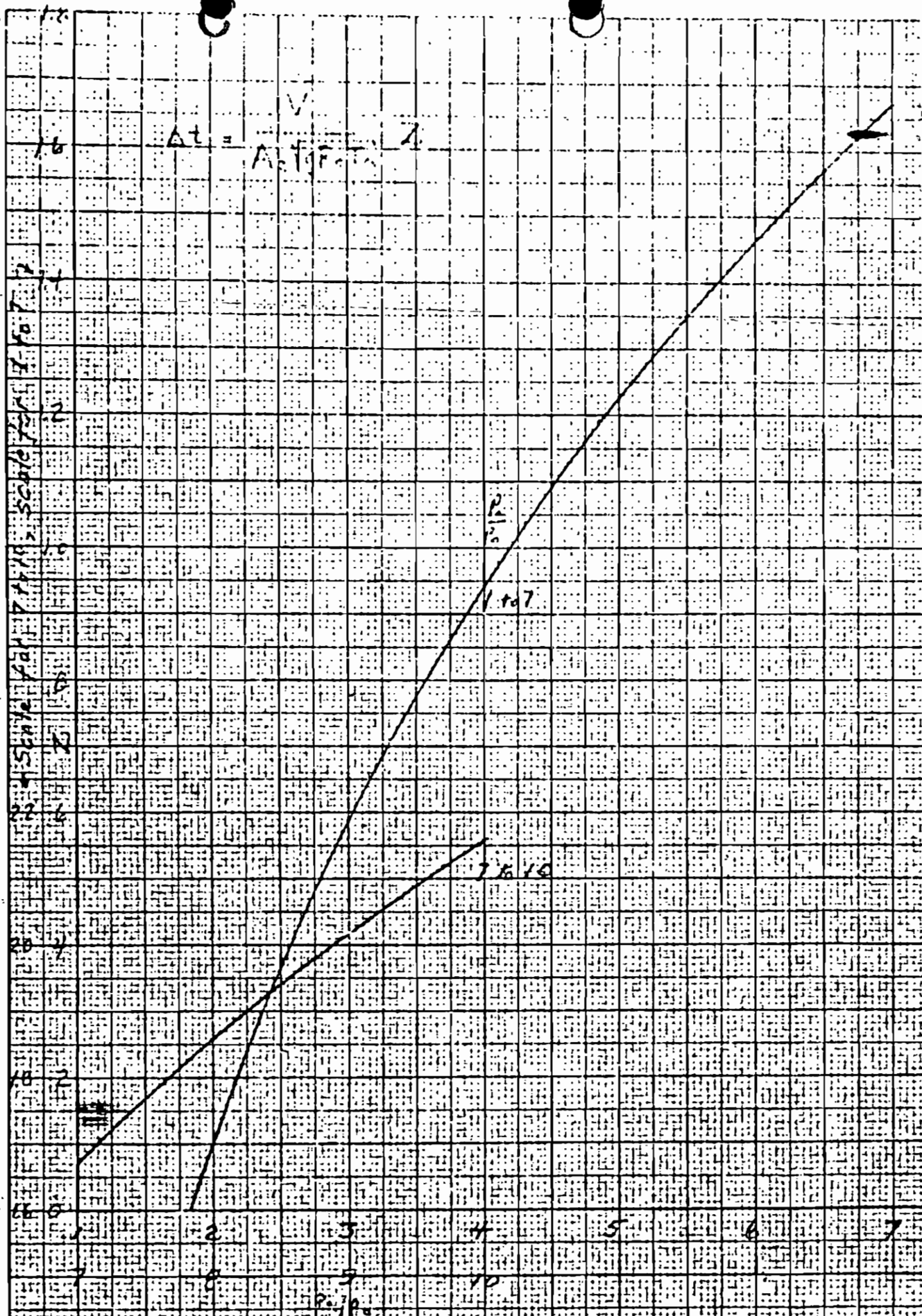
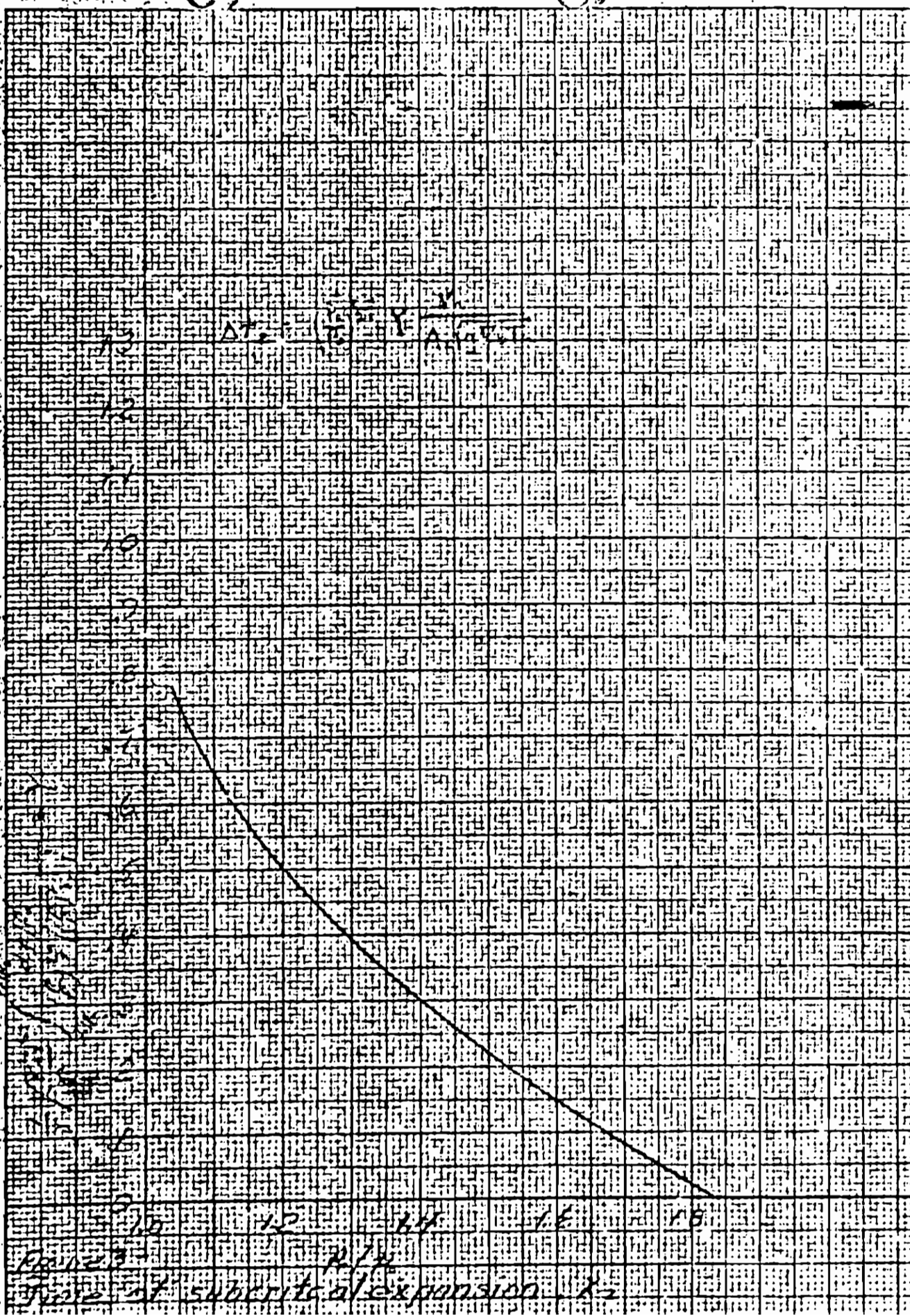
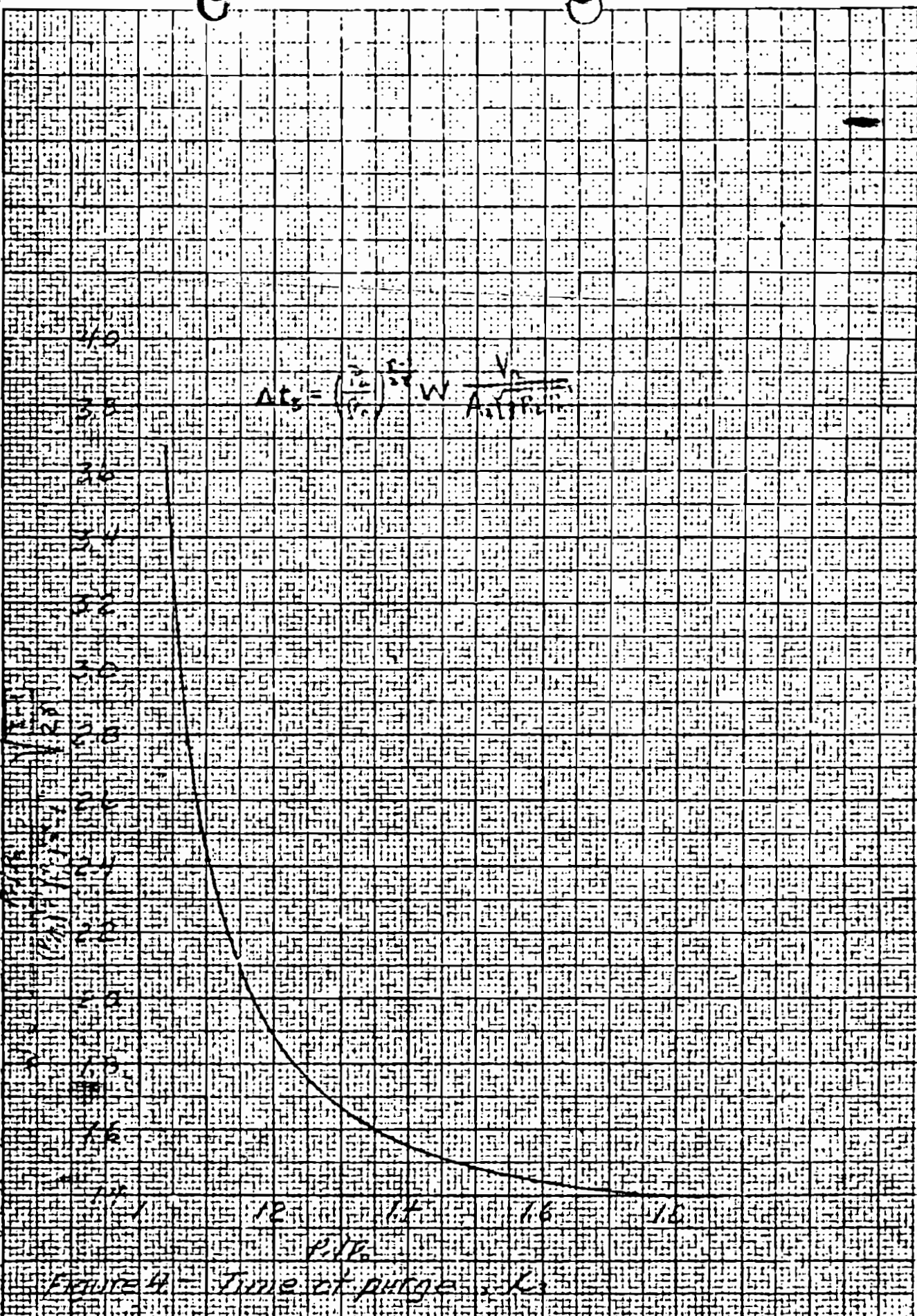


Figure 2 - Time of supercritical expansion



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$$\Delta t_s = \left( \frac{2}{\pi} \right)^{1/2} W \frac{V}{A \sqrt{2gH}}$$

FIGURE 4. Time of purge,  $t_s$



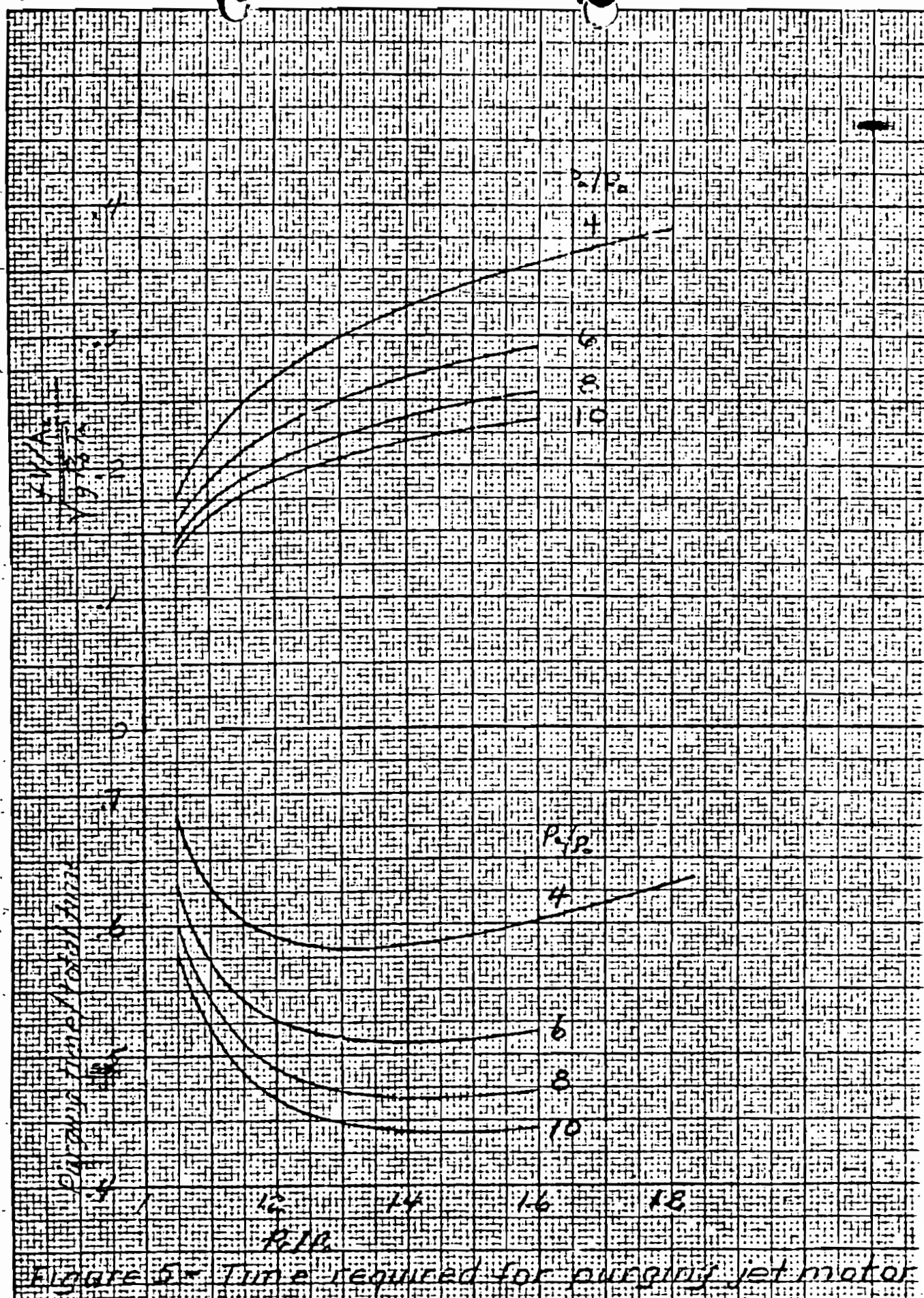


Figure 5- Time required for purging jet motor

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August 11, 1945

The Committee met in the Executive Conference Room on August 11, 1945 at 12:00 Noon. Present:

Mr. Jacob V. Hoffman  
Mr. James S. Hargis  
Mr. Nicholas Murray  
Mr. Alexander L. Glavin  
Mr. D. W. Johnson  
Mr. W. J. Patterson  
Mr. J. E. Schuy  
Mr. T. E. Ralston  
Mr. Carlton Kemper  
Miss H. H. Hall, Secretary

Victor J. Kopp

Sir H. Volatile Jones  
Mr. J. E. Schuy  
Mr. J. E. Ralston  
Mr. J. E. Patterson

The Committee met with Sir H. Volatile Jones and Messrs. Kopp and Kemper at 1:00 P.M. in order to obtain any additional information that the British had available on the German rocket development. Sir H. Volatile Jones stated that the Germans had carried out by the British on super-sonic flight. He stated that the Germans had two general plans to record the movement of the unit as it moved down through the sonic range, had been built into a unit to obtain super-sonic velocities. Both the line of attack was of a lead weight with small wings from 25,000 to 100,000 lbs. It had been recorded by the Meteor Corp. The Meteor Corp. is planning to build an airplane with thin wings and a small body of power jets. Sir H. Volatile Jones stated that it was his opinion that the airplane would not attain speeds over 600 miles per hour but that some information could be obtained from the 300,000 ft. altitude. Sir H. Volatile Jones stated that in order to get around in the air it was necessary to have a jet unit being installed in part of the engine. He stated that a Mustang jet project will be ready for test soon and may reach 50 miles per hour in the air.

The Germans have indicated that they are planning to build a bomb of the type mentioned in the report. He stated that the bomb was some 100 ft. in diameter and was 100 ft. long. It was to be launched from the nose of the information that had obtained on the German rocket development. He stated that some of the bombs were equipped with radio transmitters to enable the Germans to follow their course. The bombs were made by the British moved 45 percent bomb load, 25 percent structure and 22 percent fuel, power plant, and controls. The power plant was stated to weigh 400 pounds and the total weight of the bomb was 1,000 pounds. The wing loading was

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The normal loss variation rate was found to be between three and four atoms per gram of iron from 0 to 600 pounds per hour flow and the results showed that at three thousand one-half pounds per hour per pound of iron the amount of loss was 590 pounds at 400 cycles per hour from which it was determined that frequency of the signal was related to the number of cycles per second and was well above the operating range.

11-5. In combating the robot bombs, the British tried to shoot them down during the climb. The turn of the tide occurred on the 10th of January after launching. About one third of the anti-aircraft guns in London and on the coast were hit by fighter planes and incendiary bombs. 3600 balloons have descended more or less regularly over the period 1940-1941. 3600 were launched for London, approximately 1500 reached London and approximately 2400 made land fall. Blast effect of the exploding bombs was said to be very bad as the bombs were equipped with a 3.5 second fuse and would explode on contact with anything even above the ground level.

Dr. Jacob stated that the laboratory was interested in the ram-jet cycle as a power plant installation and would like to see ram-jet installations for military purposes. General Turner, Hutterer, and Jacob discussed theoretical analyses which they had made on steady-flow and intermittent-flow ram-jet cycles. Dr. Jacob noted with this audience that if the theoretical performance is approached, the power and economy of the ram-jet approaches that of the turbojet cycle.

**Secretary, Ram-Jet Committee**

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August 15, 1946

The Committee met in the Executive Conference Room at 9:15 a.m. on August 15, 1946.

- Mr. E. J. Connelley, Chairman
- Mr. Benjamin Franklin
- Mr. Richard Turner
- Mr. O. J. Schey
- Mr. A. M. Rothrock
- Mr. J. H. Tupper
- Mr. A. H. Johnson
- Mr. A. H. Kamen
- Mr. W. A. Nicholson
- Mr. W. H. Hall

The minutes of the meeting of August 14, 1946 were approved.

Mr. Connelley made during his opening remarks a list of valves of interest. The discussion on valves was the question of what is desirable in valves and drawings and would be proposed valves. Mr. Kamen stated that automatic valves should be considered in this case with springs on the automatic valves. Mr. Turner stated that in the design of valves to get around the valves were to be considered by all groups. Mr. Turner stated that the spring loaded valve or the same function or operated separately. Mr. Turner stated that the design of this valve pointed out that the valve should be operated by the spring on pressure but that it might be involved with the idea of the need for energy storage. Mr. Turner stated that the calculations show that an area greater than the area of the valve, the exit nozzle area is a general one, the increase of good charge.

Mr. Turner presented a model of an automatic valve which he stated would open with a head of water to three inches water column at the standing edge. Mr. Kamen presented a drawing of a valve design consisting of a coil spring and a valve which would open and shut by coil springs. Mr. Kamen stated that with a small movement of the air coil and taken place when the coil is pushed in opening and then the valve is dropped. The loss of air allowed the springs to close the valve. Mr. Turner pointed out that with sealing at two points in the pivot between, as used in Mr. Kamen's proposed valve, a difficult problem arose because contact at one edge with clearance at the pivot would allow opening at the other edge. Mr. Schey stated that a small amount of spring action at the contact edge should be used to compensate for clearance.

At this point Mr. Connelley briefly discussed the further work of the German Cam-Jet team which was observed on the design of a valve which

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He stated that considerable difficulty was encountered in the design of the valve and that the first model was a poor one. He stated that the design of the valve was very poor and that it was not mechanically strong. He stated that the design of the valve was not satisfactory.

Mr. Turner discussed the design of the valve and the design of the valve. He stated that the design of the valve was not satisfactory and that the design of the valve was not satisfactory. He stated that the design of the valve was not satisfactory and that the design of the valve was not satisfactory.

In the discussion of valve characteristics, Mr. Turner pointed out that the opening was needed to get good area ratio between inlet and exit. Mr. Turner stated that full closure was necessary to prevent losses in connection with the rapidity of pressure rise that might be obtained for automatic valve closure. Mr. Jacobs said that pressure rise in the connection were attainable.

At this time, Mr. Jacobs asked for comments as to which valves should be used in the first test. Mr. Jacobs suggested that simple valves should be used. Mr. Jacobs said that these tests could be carried out rapidly and the design of the valve was desirable. The group agreed with his suggestion.

In connection with the combustion part of the cycle, Mr. Jacobs stated that in his opinion, the inlet valve should stay open until combustion started to prevent loss in pressure between valve closure and starting combustion. Mr. Jacobs also stated that combustion should start at the back of combustion chamber and be completed very rapidly. The group concurred with these ideas. It was suggested that a twin system be used with ignition controlled by valve timing. Mr. Jacobs said this idea had been included in one of the designs by his group.

Work for the ensuing year by the various groups is to include further work to complete the valve designs believed most promising to the point where construction of the models could be started. Design of valves will be started as soon as the designs are completed and the valves can be constructed. The valves are to be static tested first to determine their characteristics. After static tests are completed, tests will be made in a device simulating a reciprocating piston down stream from the valve or other intermittent flow scheme to simulate operating conditions.

The scale of the models to be used for flow tests was discussed. The group agreed that model sizes of 0.5 inch in diameter would be determined by the practical factors involved by the particular design and that individual groups would determine what size models to use in the general sense that actual operating conditions would be simulated as closely as practicable. Drawings and sketches of combustion systems are to be made by the various groups for presentation and discussion at the next meeting of the Committee. The Chairman emphasized that

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VALVE TEST CONFERENCE

August 15, 1944

When the meeting took place in the conference room at 11:00 AM on August 15, 1944, the following persons were present:

Mr. Jacobs, Chairman  
Mr. Butterperl  
Mr. Schuy  
Mr. Johnson  
Mr. Brown  
Mr. Freeman  
Mr. Thompson  
Mr. Hall, Secretary

The minutes of the meeting of August 14, 1944, were approved as read.

Progress made on valve design and test results was discussed. Mr. Butterperl reported on the results of the test of the group and made on their own design and the model supplied by Mr. Jacobs. The valve design made by Mr. Butterperl's group was approved by the committee. The test results on the valves supplied by Mr. Jacobs showed comparatively high pressure losses. A valve design based on the results of the test was attached on the board as shown in the following sketch:



Open Closed

Mr. Butterperl said that a valve of this design would be made up and tested.

Mr. Jacobs then discussed the results of further calculations on the valve design based on the data previously discussed. The spring constant was found to be high because of the use of a heavy spring as used in the design and revisions were made to reduce the weight of the moving parts, but the reduction in inertia by the revision did not sufficiently reduce the weight of the design. Mr. Jacobs then said that a valve should be designed to utilize the inertia effect to throw the valve open.

A discussion of the possibilities of the use of a combination of valve design and inertia to accomplish better valve operation and the effects of inertia on the operation of the valve was discussed. The effects of inertia on the operation of the valve was discussed. The effects of inertia on the operation of the valve was discussed.

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Mr. Pankel showed a drawing of a test apparatus for the combustion chamber design. The setup consisted essentially of a mounted and a removable unit with means for measuring air flow and a source of air flow. The air flow was controlled by a surge chamber mounted just immediately upstream from the combustion chamber. The unit would be mounted externally and would therefore not be in contact with the surge chamber in the event of test failure in the system. The unit was not in operation. The possibility of explosions occurring in the system and means for prevention or control of such an explosion to be made a primary objective of the test. Mr. Pankel also pointed out the proposed form of the test apparatus and the test and Security Committee for recommendations. The possibility of explosion, the proposed test and the motion on all conditions was also to be looked into.

During the next year, the group also can make work on composite and 12 to study possible heavy engine engine and system of other engines that will allow for in construction as a under way as soon as possible.

*James W. Hall*  
James W. Hall  
Secretary  
San Francisco, Calif.

JAH:db

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# DAVIDSON'S

**UPCATEL - CREDIT**

**Richard Turner**

## **Hieronymus**

**Don't forget to**

## Benjamin Franklin

## Matterperi

**B. B. Dittol**

## Carlton Kempster

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On the night of 2/12/45, at the 7/10 long meeting, Jack approved a lead wire unit for the power plant. In connection to a statement he had made which was recorded in the minutes of the 7/10 long meeting, the 7/10 O. 27 cycles per second frequency for the Jacobs valve motion should have been given as 100 cycles per second.

The Director of Research reviewed projects received by the Committee from the Army and Navy for research on ram jet installations. The Navy project had only one specification, which was to give the diameter down to 20 inches, suitable for ram jet installation. Drawings are included in the Navy request. The Army has requested research on a specific ram jet. The Army request is for research that will lead to development of ram jets that will have a range of 400 miles at 350 mph, and a 1500 lb. bomb load. war head. As a result of the Army request, an informal meeting took place in Washington to discuss the proposed research. The research will include power plants that obtain oxygen from the air and use the stored energy to start combustion. The aerodynamic aspects of the ram jet will be worked out by human test. Some of the research has been carried out in research which has resulted in improvement of the stability and control of the aircraft.

As the Director suggested that the first phase of the Army project should be a survey of the possibilities for obtaining the specifications for the down land, and to determine the approximate size and location of the site, the specific information required is noted that the design of the down land is estimated to cost \$5000.00.

Dr. Lewis stated that he had raced it, talked with the two Coombs about it and of the German robot bomb. The Royal Air Force establishment, Mr. Coombs stated that the unit had overheated on ground tests. Mr. Coombs stated that Wright Field may use a blower at the inlet for their tests which had an annular slip, 20 to 25 A/ft of cooling air over the outside fan, also with satisfactory results.

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The Director raised the question of whether the work was tending away from good ground operations to attain optimum operations at high speed. It was agreed that this point must be taken and the suggestion was made that a Jettableable and one to be used in improve ground operations. The Chairman



The next meeting for the group was at Fort Rucker, 17-25-60 and the three groups were requested to survey the different possibilities for meeting the Army requirements and make sketches by the next meeting. The preliminary estimates for the group to work out included 9000 pounds total weight with a thrust of 1200 pounds and possibly up to 1800 pounds needed to attain the 350 mph velocity requirement.

Received and printed: **1945-25**

*James M. Hack*  
James M. Hack  
Michigan State Community College

THE END



00-0125-0125

1. J. J. Jacobs, Chairman  
 2. J. Schey  
 3. E. Kuman  
 4. H. Pressman  
 5. Richard B. Burt  
 6. J. F. Carlson  
 7. J. M. Pinko  
 8. J. J. J. J.  
 9. J. J. J. J.  
 10. J. J. J. J.

The Amstern showed without that the had had (with the initial and located) the rear using a minimum that and a 100 percent second vent which he had reported was shown with the initial unit (stage in front and the discharge made in the form of segments of a minimum of the loop on the 14 arrangement of the discharge had not been completed on the front, and possible Hossen and other factors involved in the discharge sets for this information were discussed. The maximum diameter of the discharge for the two layouts was 4.5 inches.

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Each station must also be made on the "Official" range of 50-700 yards, 1000 meters, and must be noted on the "Official" map. If a station is unfavorable, it may be made on a "Secondary" range (usually 100-500 yards).

The specific call orders to be submitted was agreed upon and a time table was discussed and it was agreed that the unit's type unit was the most suitable for the propulsion unit in view of the specifications laid down and further alterations would be made in the unit designed along the lines outlined in the drawing shown by Mr. Hantschpach.

The meeting adjourned at 11:15 a.m.

SECRETARY OF THE ARMY



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The Committee on the Development of the Atomic Energy Industry  
1941-1945

- Mr. Wagon
- Mr. Schuy
- Mr. Silverstein
- Mr. Tamm
- Mr. E.A. Tamm
- Mr. Clegg
- Mr. Glavin
- Mr. Ladd
- Mr. Nichols
- Mr. Rosen
- Mr. Tracy
- Mr. Carson
- Mr. Egan
- Mr. Gurnea
- Mr. Harbo
- Mr. Hendon
- Mr. Pennington
- Mr. Quinn
- Mr. Nease
- Mr. Gandy

The minutes of the meeting were read and corrections made.

The report of the committee on the development of the atomic energy industry was presented. The committee had been organized in 1941 to study the possibilities of developing the atomic energy industry in the United States. The committee had held several meetings and had conducted extensive research into the various aspects of the industry. The report contained a detailed analysis of the current state of the industry and a plan for its future development.

The committee had found that the atomic energy industry was a promising field for development. It had the potential to provide a source of power that was clean, efficient, and virtually unlimited. However, there were several obstacles that had to be overcome before the industry could be developed on a large scale. These included the need for more research and development, the need for a reliable source of raw materials, and the need for a strong regulatory framework. The committee recommended that the government should take a leadership role in the development of the industry. It should provide funding for research and development, it should establish a regulatory agency to oversee the industry, and it should encourage private industry to invest in the industry.

The committee also recommended that the government should establish a system of licensing for the industry. This would ensure that only qualified individuals and organizations would be allowed to operate in the industry. The committee also recommended that the government should establish a system of safety standards for the industry. This would ensure that the industry would be operated in a safe and secure manner. The committee's report was a landmark document in the history of the atomic energy industry. It provided a clear and concise plan for the future development of the industry and it laid the foundation for the policies that would be adopted by the government in the years to come.

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Mr. Schrey stated that the unit as designed should provide 900 horsepower at 550 miles an hour at 15,000 feet altitude and that the specific weight should be approximately 475 pounds per thrust horsepower. The over-all diameter of the unit was approximately 25 inches.

Mr. Schrey noted that the Navy was very much interested in the cast iron engine design. One chairman stated that it was his opinion that improvement in the Ford-bull engine unit was the best chance for the NACA to make a substantial contribution. The group concurred in this opinion. A number of valves of NACA design will be tested in the Ford-bull unit as soon as possible after the unit arrives.

The meeting adjourned at 11:00 p.m.

Jesse H. Hall,  
Secretary, Plan Jet Committee

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RAMJET CONFERENCE

January 5, 1945

The Committee met in Mr. J. E. Bressman's office in the Compressor and Turbine Research Facilities Building at Cleveland on January 5, 1945, at 9:45 a.m. Present:

Abe Silverstein, Chairman

W. B. Pinkel

A. M. Rothrock

O. W. Schay

J. E. Bressman

A. E. Kuman

W. E. Howard

O. Burgess

W. B. Hall, Secretary

The Ram Jet Committee met to review the design of the NACA aero-pulse unit. Mr. Bressman showed an assembly drawing of the NACA unit in which the sections were flanged to facilitate changes. Two valve designs were being considered for installation; one has been evolved as a result of the reciprocating piston apparatus investigation, and the other is a hinged-type valve based on the results of the intermittent-flow apparatus. The valve design based on the reciprocating piston investigation is a flat valve with a re-entrant back-stop incorporated as a streamlining air body located between adjacent valves. Mr. Schay inquired if the valve had been tested. Mr. Bressman stated that the design had been tested at 35 cycles per second and found satisfactory but that the streamlining method was new.

Mr. Bressman stated that the hinged valve which is being prepared for tests on the reciprocating piston apparatus, is a modification of the design tested in the intermittent-flow apparatus with good results.

The chairman stated that the investigation on aero-pulse units would follow these lines: (1) investigation of the performance of existing units such as the type built by the Ford Motor Company, (2) the development of a better valve design on existing units, and (3) the development of a completely new design.

Mr. Pinkel reported on the first phase. He stated that preliminary calibrations of the apparatus were being made and the unit should be ready to run in a day or two. Mr. Silverstein inquired as to what investigations had been made concerning the effect of vibration on the building and equipment. The possibility of damage from the vibration set up by the unit, and the fire hazard were discussed by the group. Mr. Pinkel said that he would look into the problem and discuss it with the Accident Investigation Committee.

Mr. Pinkel stated that it was planned to measure thrust, airflow, temperature at the inlet, fuel flow, total heat at the inlet, static pressure in the surge tank, average total pressure ahead of grid, and pressure variation by means of piezo-electric pick-up. Motion pictures will be taken of the exhaust flame and consideration is being given to using a maximum pressure gage. It

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was stated that limited instrumentation was being used to reduce the required running time to a minimum.

Mr. Silverstein suggested that the fire department be notified when the tests were ready to start.

Mr. Silverstein stated that a new unit and two spare grills which were intended for tests in the Altitude Wind Tunnel (as cancelled) will be available soon.

Mr. Bressman showed drawings of a valve intended for tests in a grill made up to fit the Ford unit. The valve is approximately four times the size of the German valve. Mr. Bressman stated that the hinged-type valve will be ready for tests in the reciprocating piston apparatus in about a week. The hinged valve will be made of 4015-inch Swedish-blue steel stock.

After discussion by the group it was agreed that the hinged valve design incorporated in a grill to fit the Ford-built unit would be the first modification to be tried. Mr. Pinkel stated that the equipment will be ready for installation of the new grill in about three weeks.

Mr. Bressman stated that the valve would be ready in about one week and that it would take approximately three additional days to draw up the design for the German unit. To expedite the modification it was agreed to proceed with drawing up the best design for use in the German unit based on current knowledge and modify the design, if necessary, as a result of the tests in the reciprocating piston apparatus before construction is actually started.

Mr. Burgess showed a drawing of a small-scale unit using a smaller valve with a combustion chamber for the purpose of testing the valve under combustion conditions.

Mr. Pinkel stated that the current aero-pulse project is really a development job and on this basis the proposal of Mr. Burgess would be out of line in that it is essentially research equipment.

Mr. Pinkel stated that it was his opinion that the combustion problem involved in the design would be a difficult one. He agreed that close simulation to the actual operation as would be obtained with the unit was very desirable but that results would only be qualitative from the combustion standpoint.

In view of the fact that consideration of Mr. Burgess's proposal hinged on whether the NACA intended to go into research on aero-pulse unit, this question was discussed by the group. Since the results of modifications made in the Ford-built unit would probably be a determining factor, it was decided to leave the proposal pending test results on the Ford-built unit.

Mr. Bressman reviewed the design of the NACA aero-pulse unit which is still testing. It has a combustion chamber to fuel-air ratio of 11 and is intended to operate at 45 cycles per second. The fuel supply system designed



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-3-

for the unit incorporates an interrupter mechanism for controlling fuel injection. The interrupter mechanism has a lapped fit in the rotor for sealing. Mr. Winkler suggested that a simpler system might be arrived at.

Mr. Rothpel stated that from his experience he didn't see how the interrupter could be anything but expensive. He suggested that a member of the group discuss the problem with Cleveland Diesel and other manufacturers or Diesel manufacturers.

Mr. Schaefer suggested that manufacturers of hydraulic equipment might be of some assistance. Mr. Pressman said that he would discuss the problem with local manufacturers. He suggested approval of the suggested system will be made when additional information on construction of the interrupter mechanism is available.

Mr. Pressman stated that 9/16" injection valves were incorporated in the grill or fuel injection and that the nozzles were pointed upstream. Four spark plugs would be used for ignition.

Mr. Pressman stated that in the valve design the free flow area in the grill was 1.5% of the total area as compared to 32% for the unit built by the Ford Motor Company.

Meeting adjourned at 12:15.

W. Jesse H. Hall,  
Secretary, Ram Jet Committee

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RAMJET CONFERENCE

February 13, 1945.

The committee met in the Executive Conference Room at Cleveland on February 13, 1945 at 2:00 p.m. Present:

Wabe Silverstein, Chairman

W. W. Schey

B. Pinkel

A. M. Rothrock

J. H. Hall, Secretary

The minutes of the previous meeting were read and approved as read.

The Chairman stated that there was increasing interest in the ram-jet type propulsion unit with the guided missile program. It was noted by the Chairman that Colonel Massell had suggested the use of the ram turboless aircraft instead of guided missile.

A review of progress accomplished since the last meeting of the committee by the committee members was requested. Mr. Pinkel stated that 100 ft. of the Ford built intermittent-flow ram jet had been made with ram pressures from 0.25 to 2.0 of water at various fuel-air ratios. Data from these tests had been turned over to the computer and the results will probably be available before the end of the meeting.

Mr. Pinkel stated that examination of the motion pictures of the exhaust showed flames issuing from the tail pipe for 30% of the cycle and the flame appears to be sucked back at the completion of burning. It was noted that the flame shape differed from cycle to cycle. Mr. Rothrock stated that Colonel Massell had mentioned variation in the cycles observed in motion pictures taken at Wright Field. The Chairman stated that an intermittent-flow ram jet twice the size of the Ford built unit had been constructed at Wright Field. This unit developed a thrust of 1900 pounds with lower fuel consumption than with the smaller unit but resulted in a number of broken windows.

Mr. Pinkel stated that the Army was interested in using two of the Ford built units on the P-51 to increase the speed of that airplane. Of the ideas being considered are the use of auxiliary rocket and the use of supersonic intake or increased engine power. Mr. Pinkel stated that the single combustion unit had been made to cycle and motion pictures of the flame had been taken. The Chairman inquired as to what advantages would be obtained from controlled ignition. Mr. Pinkel stated that controlled ignition would make each cycle independent and should result in an increase of maximum pressure. The motion pictures showed flames starting at the spark and moving along with the flow until the first flame sphere reaches the nozzle at which time the flame front moved upstream to complete the burning of the charge. Three ignition points per cycle were indicated.



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The first set of valves failed in a short time under cycling conditions and the second set was constructed of a thicker material with resulting longer life. The valve section is being redesigned to incorporate an improved valve design based on the results of valve tests by other groups.

Mr. Rothrock stated that it appeared desirable to get very rapid combustion or possibly detonation. The Chairman suggested the addition of an explosive to hydrocarbon fuels. Mr. Rothrock stated that this type of fuel was scheduled for investigation.

Mr. Rothrock stated that Mr. North at Wright Field is working on a fuel program including factor of ram jets to be submitted by the Army to the AEC. Mr. Rothrock stated that consideration was being given to the burning in the shock wave in a steady-flow ram jet.

Mr. Pinkel stated that the second burner design for the steady-flow ram jet unit would consist of two annuli with annular shielded zones and fuel nozzles injecting into the shielded zones. The burner had 40% reaction in free flow at the burner section area and holes in the shields for the introduction of primary air for the burning process. When operating at approximately one pound of air per second at an air-fuel ratio of 30, a combustion efficiency of 52% with a pressure drop of 14% was obtained. The flame length was 3 feet. The 14% pressure drop is equal to approximately four inches water at the conditions.

The Chairman stated that it would be desirable to install the burner in the steady-flow ram jet unit if it was in a hurry to run. Mr. Pinkel stated that the burner could be installed but that he would like to obtain additional test results on the burner. It was agreed that the burner would be installed immediately and that Mr. Pinkel's group would cooperate in obtaining additional burner information as the tests progressed. It was further agreed that reports on the steady-flow ram jet performance would be prepared by the Engine Installation Research Division and reports on burner performance would be prepared by the Thermodynamics Division.

Mr. Pinkel stated that there was a favorable interference between the pressure drop due to area reduction at the burner and the pressure drop caused by combustion. It was noted that the pressure drop under operating conditions was less than the cold pressure drop plus the calculated momentum pressure drop from burning.

The Chairman stated that it would be very desirable for the laboratory to get out results on the steady-flow ram jet ahead of Professor Rottell at the Massachusetts Institute of Technology who is working on a ram jet project for the Army. Mr. Silverstein stated that with the first burner installation two of the burners didn't work but the pilot alone worked on all burners. Mr. Pinkel stated that with this type of burner if the burner was not working it was almost certain that the pilot flame was out.

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Mr. Silverstein stated that it was planned to run individual lines to each burner unit and then by adding sheltered zones at the burner entrance. Mr. Pinkel noted that the sheltered zones resulting from the fuel lines had been streamlined out when the installation was made. Mr. Pinkel stated that the burner developed for the JICA jet-propulsion unit appeared to be a good design for use in the steady flow ram jet. Mr. Silverstein described the burner developed by Professor Hottell with fuel injection normal to the stream in a flame stabilizer downstream from the fuel injection.

The data from the Ford-built unit was shown to the group by Mr. Pinkel at this time. The data showed that maximum thrust of 617 pounds was obtained with 20% water ram, 50,000 pounds of air per hour, and 2400 pounds of fuel resulting in a fuel air of 0.48. The unit operated at 100 cycles per second. Mr. Pinkel stated that the unit operated satisfactorily except for shaking the instruments.

Mr. Schey reviewed the work that had been carried out on valves. A valve had been developed that was twice the height of the German valve and operated successfully for three hours at 40 cycles. The design to incorporate this valve into the Ford-built unit was completed and is ready to go into the shop. The committee approved the construction and tests of this grill design in the Ford unit.

Mr. Schey reported that the hinged-type valve had very short life in the reciprocating piston apparatus. Mr. Silverstein pointed out that the changes made in the spring details may have resulted in the short life.

Mr. Schey showed a new valve design made up with a curved and straight piece riveted together that had been constructed. He stated that other valve developments are also in progress.

Mr. Rothrock stated that two groups were working on the general combustion problem. One group, under Mr. J. C. Sanders, was working on a problem of fuel properties required for jet-propulsion units. A second group, under Mr. I. Irving Pinkel, was working on the fundamentals of combustion, turbulence and pressure effect at altitude. Doctors Richs and Simon are working on the problem of mixing fuel and air and Mr. C. B. Miller was working on the problem of mixing utilizing photographic methods.

Mr. Rothrock stated that Colonel Vassell and Mr. North discussed a project request for basic research on combustion in which Mr. North stated that emphasis should be placed on ram jets.

The following list of questions to be answered as results of this work were proposed by Colonel Vassell and Mr. North:

1. What is max. heat release /cu ft./unit time.
2. What increase possible for hydro carbon fuels - other fuels.
3. What is the max. air velocity or flame speed for hydro carbon fuels.



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1. What is the limit of mixture ratio for H.C. fuels.
2. What is velocity head loss for burning.
3. What is velocity head loss for mixing fuel and air.  
Comments on liquid spray, air aspirated mixing, pre-carb. mix.
4. What is meaning or correlation of flame color to rate of heat release.
5. Available energy of heat release as affected by condition of burning of the fuel (detonation wave pressures, etc.)
6. What is the relation between flame, visibility, and heat release.
7. What is the difference of flame travel in stationary fuel mixture as compared to stationary flame in moving fuel mixture assuming turbulence of same degree in both cases.
8. Is there a radiant energy transfer from the burning front to the yet unburned fuel.
9. Are there catalysts or additions for hydro-carbon fuels which will cause higher burning rates.
10. What are the condition parameters to promote detonation.
11. What is a good yardstick for measuring the desirability of a jet fuel.
12. How can the B.T.U./unit volume be increased.
13. What basic parameters should the fuel characteristics be described with for a jet fuel.

Mr. Rothrock stated that one group of chemists in the Fuels and Lubricants Division have started an investigation on the use of catalysts in combustion.

The meeting adjourned at 4:00 p.m.

*Jesse H. Hall*  
Jesse H. Hall  
Secretary, Ram Jet Committee

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RAMJET CONFERENCE

April 14, 1945

The committee met in the Executive Conference Room at Cleveland on April 14, 1945. At 2:00 p.m. Present:

Abe Silverstein, Chairman

Dr. Pinkel

Mr. W. R. Rothrock

Mr. W. W. Schoey

Mr. H. Hall, Secretary

The reading of the minutes of the last meeting, January 15, 1945 was dispensed with. The chairman reviewed the discussion that had taken place with Doctor Goss, Miller, and Kramm during his recent visit to the laboratory concerning the Humblebee project. The project assumed the direction of a pulse group at the Johns Hopkins Applied Physics Laboratory in Silver Spring, Maryland, this being carried out for the Navy Department, Bureau of Ordnance. The project is for the development of a light weight missile using a steady flow ram jet as the power plant. The chairman stated that the drag was obtained on the Humblebee project gave results similar to those obtained at Langley. It was pointed out that cold model had already been tested using telemetering instrumentation and problems of launching. Two problems expected were some difficulty in the project area the air flow problem and the fuel system. It was pointed out that the fuel system during the pressure rise across the air filter might work in a opposite direction than the missile goes slightly from the design conditions to bring the unit back to the design conditions. Mr. Schoey suggested the possibility of adjusting the fuel flow to the air range so that leaning out would increase the thrust. Mr. Pinkel stated that compensated fuel controls appeared necessary.

The chairman made a strong recommendation for more emphasis on the missile program at this laboratory because of the intense interest evidenced by both the Army and Navy. The question was raised as to whether the laboratory could drop other projects to allow the increased work on missiles. Mr. Rothrock stated that the laboratory projects would be reviewed with this in mind.

The chairman stated that the design of supersonic compressors offered considerable promise if an efficient design could be worked out. He stated that Dr. Kantrowitz at MIT had done some work along this line. Mr. Pinkel suggested that the laboratory should carry the steady flow ram jet project through flight tests. The chairman pointed out that MIT was working on setting up a test station for such flight tests.

The chairman stated that the NACA Special Committee on Self-Propelled Guided Missiles was scheduled to meet on April 18 and that he would like to present a progress report covering LRI work to date and the program of the report to be presented. It was suggested that each member of the team write up the work under his direction by Monday, April 17, 1945.



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Mr. Rothrock stated that the Army had been given a directive to develop a rocket prime mover by April 1, 1945. The Fuel and Turbine Division is carrying out work on fuels and combustion problems on these and other problems that should be carried out at the same time. The technical development of turbopumps for liquid fuel, nozzles and gas assisting materials for cooling systems.

Mr. Schuy stated that he would investigate the use of ceramics for rocket motor nozzles.

The chairman asked for a progress report on the work accomplished since the last meeting.

Mr. Rothrock stated that tests were under way on a combustion chamber. He stated that a design had been made of a combustion chamber of the ramjet type, and a small nozzle for an air jet to study the effect of turbulence on combustion. An apparatus is being set up to study the mixing process of fuel and air and effective turbulence. Another apparatus is being set up to study the steady combustion process by means of high-speed photography. Programs are being carried out to prepare or synthesize new fuels considered to be of interest in the ramjet and rocket programs. A small-scale intermittent combustion chamber is being set up to study the combustion problem. The chairman suggested that the fuels and lubricants group look into the possibility of using the intermittent combustion chamber test apparatus of the Thermodynamics Division for these tests and to get the two groups to get together to coordinate fuels and combustion work. The chairman also suggested that the fuels and lubricants group consider the use of tracers for ignition and flame. It was also suggested that the use of sensitizers for reducing fuel after ignition temperature be looked into.

The chairman stated that a visit by Army and Navy groups interested in ramjet work had been discussed in a telephone conversation between Mr. Kemper and Mr. Lewis and asked for comments as to a suggested date. After some discussion it was decided that April 26, 1945, would be the most advantageous date. The chairman requested that proposed items to be included in the agenda for the meeting should be turned in by Monday, April 16, in order to discuss the program with Mr. Lewis who is expected on Tuesday, April 17.

Mr. Pinkel reported on progress on the jet bomb work since the last meeting. He stated that testing using the first grid had been completed and the second grid was being installed. Mr. Pinkel stated that the second grid was still in that it had been put downstream from the nozzle. After the meeting, Mr. Pinkel informed the secretary that actually both grids had the same diameter. The third grid to be tested will be the grid designed and built by the supercharger group. Mr. Pinkel stated that with 400 water, the increase in thrust by increasing ram was tapering off in this range. He stated that it was observed that at 400 water, ram the effective jet velocity was indicated to be a little higher than at 50 water. A thrust of 750 pounds was obtained at a simulated speed of 350 miles per hour and with a fuel consumption of 3200 lb/hr.

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It was stated that the pressure-time record from a quartz crystal pickup had not been very satisfactory because of severe vibration. The maximum and minimum pressure instrumentation was also found to be not too satisfactory.

The high-speed motion pictures obtained with the intermittent combustion apparatus showed uneven cycles. A surge tank had been installed in the entrance which it is believed has improved the uniformity of the combustion cycles. More evidence will be available when the high-speed motion pictures have been developed and can be observed. Mr. Pinkel stated that the apparatus was very hard on valves since the surge chamber had been put in which indicated higher maximum pressures and a higher rate of pressure rise resulting from combustion. Indicator records are being taken on the apparatus but the piezoelectric crystal and trap pressure instruments have not been working too well. Mr. Pinkel stated that the resonance drawings had been completed.

Mr. Pinkel stated that Mr. Parker at Annapolis has shown him captured German documents on the Hudding Company reporting on all sorts of aeropulse ideas.

Mr. Schoey reported that all grill castings for the pull bomb will be developed within a week and machining of the castings will start immediately.

Mr. Schoey stated that the group working on valves had obtained designs with a life of three hours with considerable improvement from a pressure-trap standpoint over the German valves. Mr. Schoey stated that the Ford-Pattis grill equipped with an MCA two-piece valve will be completed in about a week at the best. He stated that little testing was being carried out at the present and the work would increase pending the outcome of tests on the full scale unit.

The chairman asked that a list of all reports on ram jets being worked on by the group be sent to the secretary and that the list be circulated for the information of the members.

The meeting adjourned at 4:30 p.m.

W. H. Dease, Chairman  
Secretary Ram Jet Committee



**AERL**

**SECRET**

Washington, D. C.

August 16, 1944

From: NACA  
To: Cleveland

Attention: Mr. Kemper

Subject: Request of Army Air Forces to develop a  
guided missile

1. There is enclosed herewith copy of Army Air Forces letter dated August 4, 1944, requesting that the NACA undertake a program to develop a guided missile in cooperation with the Materiel Command of the Army Air Forces. It will be noted that the Army Air Forces has requested that the NACA develop the vehicle and the jet power supply parts of the missile leaving the remote control devices and launching mechanisms up to the Air Forces.

2. The comments and recommendations of the laboratory are requested concerning this requested development program. The Army Air Forces is being concurrently informed that the Committee will undertake this investigation and that a conference will be arranged to discuss preliminary design studies.

3. Research Authorization No. E-110 has been assigned to this investigation and a copy will be forwarded to the laboratory in the near future. It should be noted that the Army desires this development to take place in a minimum period of time.

G. V. Lewis  
Director of  
Aeronautical Research.

**SECRET**



~~SECRET~~

Washington, D. C.  
August 16, 1944

From: NACA  
To: Cleveland

Attention: Mr. Tupper

Subject: Request of Army Air Forces to develop a  
guided missile

1. There is enclosed herewith copy of Army Air  
Forces letter dated August 4, 1944, requesting that  
the NACA undertake a program to develop a guided mis-  
sile in cooperation with the Materiel Command of the  
Army Air Forces. It will be noted that the Army Air  
Forces has requested that the NACA develop the vehicle  
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to the Army Air Forces.

2. The comments and recommendations of the lab-  
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that the Army desires this development to take place in a  
minimum period of time.

G. H. Lewis,  
Director of  
Aeronautical Research

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COPY

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Address reply in ENVELOPE to:

Commanding General

ARMY AIR FORCES

Headquarters

Air Materiel Command

Air Materiel Command

Fort Belvoir, St. Louis, Mo. 63103

Engineering Division, Office of the Commanding General

Reference: Dept. 50

Wright Field, Dayton, Ohio 45433

National Advisory Committee for Aeronautics

1200 New Hampshire Avenue, N.W.

Washington 25, D.C.

Attention: Mr. C. W. Lewis, Director

of Aeronautical Research

Dear Mr. Lewis:

The Materiel Command is at present making a thorough study of the development of long range, ground-launched, pilotless, controlled missiles. For immediate importance is the design of a preset guided missile of 100 to 250 miles range.

The Army Air Forces desires, however, to develop in the minimum period of time a pilotless guided missile, ground-launched, which would have a range of 100 miles with the application of remote control for the accurate hitting of military objectives. The requirements for this type of missile have been prescribed, and are as follows:

- (a) Range - 100 miles
- (b) Payload - 1000 lb. demolition bomb
- (c) Speed - 550 mph.
- (d) Control - Remote or target seeking

The general requirements dictate that this missile be of the simplest construction and minimum size. It is further desired to propel this missile by means of jet propulsion. However, due to the urgency of the program, the type of motor to be used must be limited to one of the existing types or a new design which would be readily available.

In order to accomplish the development of such a missile it is felt that the program should be divided into three parts, namely: (a) the vehicle itself, (b) the jet power supply, and (c) the remote control devices and launching mechanisms.

It is requested that the NACA undertake a program in cooperation with the Materiel Command to develop parts (a) and (b). If such a proposal is feasible to the NACA it is requested that the following action be taken:



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Memorandum

The Laboratory of the NACA immediately begin a preliminary design study of possible vehicles and propulsion systems to accomplish the general requirements as stated above.

At the earliest possible date a conference between representatives of the NACA and the Materiel Command be held at which time the design studies would be evaluated.

The comments of the NACA in regard to such a development program are requested.

Very truly yours,

(Signed) W. Z. Bogert

W. Z. Bogert

General Staff  
Engineering Division

1. This Division, WBS, C/S, S  
2. Administration, D-1  
3. Liaison, Command Liaison Office  
4. NACA Lab., Langley Field, Va.  
5. Liaison, Liaison Office  
6. Liaison, Liaison Office  
7. Liaison, Liaison Office  
8. Liaison, Liaison Office  
9. Liaison, Liaison Office  
10. Liaison, Liaison Office



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PERSONAL ATTENTION  
STRICTLY CONFIDENTIAL

Cleveland file 65-2751

Reurlet July 12, 1951, enclosing the originals of certain correspondence concerning research on pilotless guided missiles, and reports entitled "RCM Jet Conference Minutes," all of which were obtained from the files of the National Advisory Committee for Aeronautics (NACA) in Cleveland, Ohio.

However, it is evident from the "Ram Jet Conference Minutes" that William Perl was actively associated with and participated in the experimentation performed by NACA with respect to the guided missiles project. However, it is rather conclusive that the information concerning the robot bomb as allegedly reported by the individual referred to under the cover name "B" was not furnished by Perl inasmuch as he was referred to under an entirely different cover name during this exact period. FS 161

It was of interest to note that in a conference on August 24, 1944, Perl discussed with the group the layout which he had made relative to the Whittle unit to be located in the rear and to use an annular inlet and an axial jet. [Further, at this same conference Abo Silverstein, NACA, furnished the opinion that the anticipated speed of 550 mph might be a little high even with the use of a Whittle unit.]

It might also be mentioned that in the minutes of the conference on August 22, 1944, Dr. George B. Bates of NACA advised that he had received a call from Daniel Kohn and had been advised that the first Ford built ~~secreted~~ <sup>secreted</sup> ~~was~~ <sup>was</sup> be ready in a day or two.

65-53543

158 Detroit  
New York

cc: 65-59312  
LFE:mpm *mpm*

Classified by 4575  
Exempt from GDS, Category 1  
Declassification Indefinite

AP/bja 2-1-78

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65-59312-48

SLIP. *Classified*  
DATE *2/1/78* BY *SP-5*  
ALL INFORMATION CONTAINED  
HEREIN IS UNCLASSIFIED  
EXCEPT WHERE SHOWN  
OTHERWISE.

Tolson \_\_\_\_\_  
Ladd \_\_\_\_\_  
Clegg \_\_\_\_\_  
Glavin \_\_\_\_\_  
Nichols \_\_\_\_\_  
Tracy \_\_\_\_\_  
Harbo \_\_\_\_\_  
Almon \_\_\_\_\_  
Belmont \_\_\_\_\_  
Laughlin \_\_\_\_\_  
Mohr \_\_\_\_\_  
Tele. Room \_\_\_\_\_  
Nease \_\_\_\_\_  
Gandy \_\_\_\_\_

65 AUG 7 1951

The aforementioned Whittle unit and Ford built unit are assumed to possibly refer to the jet system or installation which was to be used to propel this guided missile, known as the JB-2 bomb. It is therefore desired that the Cleveland division make an effort to ascertain through NACA the exact contemplated or actual dimensions (length and diameter) of the Whittle unit, Ford built unit, or any other jet unit under consideration for use on the JB-2 bomb prior to September 15, 1944.

The Detroit division is requested to make a similar check of the appropriate Ford Company file pertaining to their participation in the production of the jet system for the JB-2 bomb under subcontract with USAF. [From information made available through NACA it appears that a motor or jet assembly produced by Ford Company for the JB-2 bomb had the dimensions for the pulse jet plus burners of 16 inches in length and 8 to 9 inches in diameter.] It should be determined whether this was the only jet assembly or unit produced by that company for the JB-2 bomb, and the dimensional specifications with respect to any other unit made by that company for this bomb. Further, it should be ascertained whether the original specifications for this unit may have called for a shorter length and smaller diameter.

At the time of this inquiry, the Detroit division should make an effort to determine whether the Ford Company may have previously interposed any objection or hesitancy in going into production on this jet system within the designated period of 60 days subsequent to July, 1944. In the event production figures are available, the exact number of jet units completed as of September 2, 1944, should be ascertained. Any available correspondence between the Ford Company and the Republic Aviation Company, the primary contractors for the JB-2 bomb, should be examined to determine what information relative to the number of completed units or completed bombs and the exact dimensions thereof was available to the Ford Company during the latter part of August or first part of September, 1944.


[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]





[S] b1

The Detroit division is further requested to thoroughly review its files and references pertaining to Andrei Schevchenko, as well as any other individual who was known to have been employed by the Ford Motor Company and working on the JB-2 bomb project during this period and who was suspected of subversive or espionage activities. It might also be possible to determine from the records of the Ford Company the identity or identities of any employees working on this bomb project whose activities may have been reported as being suspicious. It should be borne in mind in this respect that most of the members of the Rosenberg espionage network who were similarly engaged in collecting scientific aeronautical information were graduates of CCNY School of Electrical Engineering.

In the event any suspects are developed as a result of the above, an appropriate check should be made as to Ford Company leave records pertaining to these employees during the period from September 1 to September 15, 1944.

~~TOP SECRET~~

This matter should receive your immediate and personal attention in view of the importance of identifying this known Soviet agent.

[REDACTED]

1956

~~TOP SECRET~~

7/16/51  
DJR

FEDERAL BUREAU OF INVESTIGATION  
UNITED STATES DEPARTMENT OF JUSTICE

Laboratory Work Sheet

~~STRICTLY  
CONFIDENTIAL~~

Re: UNSUB, wa "B"  
ESPIONAGE - R

File # 65-59312-481  
Lab. # D-134780 BE

*William Perl aka  
Espionage - R; Perjury*

LAB FILE

Examination requested by: SAC, Cleveland 65-2730

Date of reference communication: 7/12/51

Date Received: 7/16/51

Examination requested: Document

Result of Examination:

Examination by: ~~DALE~~  
Dahlstrom

*1 hr. in pencil on 8 pages of ruled tablet  
paper. in Q26 no ident. with Wm. Perl K12  
+ K13. No known hr. of L. Richard Turner*

Specimens submitted for examination

*- no comparison made to determine if he  
figured hr. on 8 pages of ruled paper Q26*

Q26 Original letters from Air Force dated 8/4/44, 8/16/44 concerning  
research on guided missiles; copies of research authorization  
#E-11C and a folder entitled "Ram Jet Conference Minutes."

return evidence

65-59312-481



Known Hw. of William Perl K12, K13  
the visit & going  
with to the

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①26 → gas volume heat being  
walls to than

Title: Preliminary Design Study in Development of Special Vehicle for Army Air Forces

Approved: \_\_\_\_\_ 194

Chairman: \_\_\_\_\_

Issued: August 17, 1944 by: H. W. Lewis

Director of Aeronautical Research

In accordance with authority of Executive Committee March 19, 1942

Purpose of investigation (Why?)

To cooperate with the Army Air Forces in the development of a vehicle meeting special Army requirements

Brief description of method (How?)

Preliminary design studies will be made of possible vehicles and propulsion systems to accomplish the performance requested by the Army Air Forces.

Remarks: Requested by the Army Air Forces, Materiel Command, in letter dated August 4, 1944, reference Department 50, Wright Field, Dayton, Ohio.

Date of report: \_\_\_\_\_

Publications: \_\_\_\_\_

Completed: \_\_\_\_\_

Form No. 10

65-579312-935



CONFIDENTIAL

INVESTIGATION SECRET

COMMITTEE FOR AERONAUTICS

AUTHORIZATION

No. E-110

1. Preliminary Design Study in Development of Special Vehicle for Army Air Forces

2. Aircraft Engine Research Laboratory

Approved

Chairman, Subcommittee on

Issued August 17, 1944

G. W. Lewis

Director of Aeronautical Research

In accordance with authority of Executive Committee, March 19, 1942.

Purpose of investigation (Why?)

To cooperate with the Army Air Forces in the development of a vehicle meeting special Army requirements.

Brief description of method (How?)

Preliminary design studies will be made of possible vehicles and propulsion systems to accomplish the performance requested by the Army Air Forces.

Remarks

Requested by the Army Air Forces, Materiel Command, in letter dated August 4, 1944, reference Department 50, Wright Field, Dayton, Ohio.

Date of report

Publications

Completed

194

Form No. 10

CONFIDENTIAL - Investigation secret



1. Preliminary Design Study in Aircraft Engine Research Laboratory  
 2. Development of Special Vehicle  
 for Army Air Forces

Approved \_\_\_\_\_

1944

Chairman, Subcommittee on \_\_\_\_\_

Issued \_\_\_\_\_

August 17, 1944

G. W. LEWIS

Chairman, Executive Committee

Director of Aeronautical Research

In accordance with authority of Executive Committee March 19, 1942

Purpose of investigation (Why?)

To cooperate with the Army Air Forces in the development  
 of a vehicle meeting special Army requirements.

Brief description of method (How?)

Preliminary design studies will be made of possible  
 vehicles and propulsion systems to accomplish the per-  
 formance requested by the Army Air Forces.

Remarks

Requested by the Army Air Forces, Materiel Command, in  
 letter dated August 4, 1944, reference Department 50,  
 Wright Field, Dayton, Ohio.

Date of report: \_\_\_\_\_

Publications \_\_\_\_\_

Completed \_\_\_\_\_

194



Title: Preliminary Design Study in Development of Special Vehicle for Army Air Forces

By: Aircraft Engine Research Laboratory

Approved: \_\_\_\_\_

194

Chairman, Subcommittee on \_\_\_\_\_

Issued August 17, 1944

A. W. Lewis

Director of Aeronautical Research

In accordance with authority of Executive Committee, March 19, 1942.

Purpose of investigation (Why?)

To cooperate with the Army Air Forces in the development of a vehicle meeting special Army requirements.

Brief description of method (How?)

Preliminary design studies will be made of possible vehicles and propulsion systems to accomplish the performance requested by the Army Air Forces.

Remarks:

Requested by the Army Air Forces, Materiel Command, in letter dated August 4, 1944, reference Department 50, Wright Field, Dayton, Ohio.

Date of report: \_\_\_\_\_

Publications: \_\_\_\_\_

Completed: \_\_\_\_\_

194



W-110

Title: Preliminary Design Study in Development of Special Vehicle for Army Air Forces

By: Aircraft Engine Research Laboratory

Approved

Chairman Subcommittee on

Dated August 17, 1944

E. V. Lewis

Chairman

Director of Aeronautical Research

In accordance with authority of Executive Committee, March 12, 1942.

Purpose of investigation (Why?)

To cooperate with the Army Air Forces in the development of a vehicle meeting special Army requirements.

Brief description of method (How?)

Preliminary design studies will be made of possible vehicles and propulsion systems to accomplish the performance requested by the Army Air Forces.

Remarks: Requested by the Army Air Forces, Materiel Command, in letter dated August 3, 1944, reference Department 50, Wright Field, Dayton, Ohio.

Date of reports

Publication

Completed

194



AERL

~~SECRET~~

Washington, D. C.

August 17, 1944

From NACA  
To Cleveland

Subject: Development of guided missile for Army  
Air Forces

Reference: NACA letter of August 16, 1944, AERL 11n

1. There are forwarded herewith six copies of the research authorization to cover the preparation of design studies for the subject investigation. Research Authorization No. E-110 has been assigned for this project.

2. Research Authorizations Nos. E-111 and E-112 have been reserved to cover the construction of experimental models and the tests of such models respectively. It was considered that this work should be done under three separate research authorizations because of the broad scope of the request of the Army Air Forces.

3. It is requested that following the submission of preliminary design studies to the Army Air Forces for review, the laboratory submit drafts of research authorizations to cover the construction and testing phases of this project. It is requested that these drafts be in this office by September 5, if possible.

Enc.

AERL 11n

G. W. Lewis,  
Director of  
Aeronautical Research.

~~SECRET~~



~~SECRET~~

Washington, D. C.  
August 17, 1944

From NACA  
To Cleveland

Subject: Development of guided missile for Army  
Air Forces

Reference: NACA letter of August 16, 1944, RKL:lin

1. There are forwarded herewith six copies of the research authorization to cover the preparation of design studies for the subject investigation. Research Authorization No. E-110 has been assigned for this project.

2. Research Authorizations Nos. E-111 and E-112 have been reserved to cover the construction of experimental models and the tests of such models respectively. It was considered that this work should be done under three separate research authorizations because of the broad scope of the request of the Army Air Forces.

3. It is requested that following the submission of preliminary design studies to the Army Air Forces for review, the laboratory submit drafts of research authorizations to cover the construction and testing phases of this project. It is requested that these drafts be in this office by September 5, if possible.

G. W. Lewis,  
Director of  
Aeronautical Research.

Enc.

RKL:lin

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E-110

RECEIPT TO BE SIGNED AND RETURNED TO THE  
CORRESPONDENCE DIVISION, NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS  
1500 New Hampshire Avenue, N.W., Washington 5, D.C.

August 17, 1944

TO: National Advisory Committee for Aeronautics  
FROM: Cleveland

Letter dated August 17, 1944 transmitting  
Research Authorization No. E-110 entitled  
"Preliminary Design Study in Development of  
Special Vehicle for Army Air Forces".

*Original receipt to  
Cleveland  
8-22-44*

(documents)  
It is understood that the document covered by this receipt contains  
information affecting the national defense of the United States within  
the meaning of the Espionage Act (USC 50:31 and 32). Full responsibility  
is assumed for the safe handling, storage, and transmittal elsewhere  
of this document, in accordance with security regulations.  
these documents.

Signed *Charles K. King*  
Date *8/17/44*



# AERL

**SECRET**

Washington, D. C.  
August 16, 1944

## From RACA To Cleveland

Attention: Mr. Komper

Subject: Request of Army Air Forces to develop  
guided missile

1. There is enclosed herewith copy of Army Air Forces letter dated August 11, 1944, requesting that the NACA undertake a program to develop a guided missile in cooperation with the Materiel Command of the Army Air Forces. It will be noted that the Army Air Forces has requested that the NACA develop the vehicle and the jet power supply parts of the missile leaving the remote control devices and launching mechanisms up to the Air Forces.

2. The comments and recommendations of the laboratory are requested concerning this requested development program. The Army Air Force is being concurrently informed that the Committee will undertake this investigation and that a conference will be arranged to discuss preliminary design studies.

3. Research Authorization No. R-110 has been assigned to this investigation and a copy will be forwarded to the laboratory in the near future. It should be noted that the Army desires this development to take place in a minimum period of time.

**Ino.**

REL 110

G. W. Lewis,  
Director of  
Aeronautical Research.

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Washington, D. C.  
August 16, 1944

From WACA  
To Cleveland

Attention: Mr. Kemper

Subject: Request of Army Air Forces to develop a  
guided missile

1. There is enclosed herewith copy of Army Air Forces letter dated August 5, 1944, requesting that the WACA undertake a program to develop a guided missile in cooperation with the Materiel Command of the Army Air Forces. It will be noted that the Army Air Forces has requested that the WACA develop the vehicle and the jet power supply parts of the missile leaving the remote control devices and launching mechanisms up to the Air Forces.

2. The comments and recommendations of the laboratory are requested concerning this requested development program. The Army Air Forces is being concurrently informed that the Committee will undertake this investigation and that a conference will be arranged to discuss preliminary design studies.

3. Research Authorization No. E-110 has been assigned to this investigation and a copy will be forwarded to the laboratory in the near future. It should be noted that the Army desires this development to take place in a minimum period of time.

G. V. Lewis,  
Director of  
Aeronautical Research.

Enc.

WACA:lla

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RAM JET CONFERENCE

January 6, 1945.

The Committee met in Mr. J. R. Bressman's office in the Compressor and Turbine Research Facilities Building at Cleveland on January 6, 1945, at 9:45 a.m. Present:

Abe Silverstein, Chairman

B. Pinkel

A. M. Rothrock

O. W. Schey

J. R. Bressman

A. E. Kman

M. R. Howard

W. C. Burgess

J. H. Hall, Secretary

The Ram Jet Committee met to review the design of the NACA aero-pulse unit. Mr. Bressman showed an assembly drawing of the NACA unit in which the sections were flanged to facilitate changes. Two valve designs were being considered for installation: one has been evolved as a result of the reciprocating piston apparatus investigation, and the other is a hinged-type valve based on the results of the intermittent-flow apparatus. The valve design based on the reciprocating piston investigation is a flat valve with a re-angled back stop incorporated as a streamline afterbody located between adjacent valves. Mr. Schey inquired if the valve had been tested. Mr. Bressman stated that the design had been tested at 75 cycles per second and found satisfactory but that the fastening method was new.

Mr. Bressman stated that the hinged valve, which is being prepared for tests on the reciprocating piston apparatus, is a modification of the designs tested in the intermittent-flow apparatus with good results.

The chairman stated that the investigation on aero-pulse units would follow these lines: (1) investigation of the performance of existing units such as the type built by the Ford Motor Company, (2) the development of a better valve design on existing units, and (3) the development of a completely new design.

Mr. Pinkel reported on the first phase. He stated that preliminary calibrations of the apparatus were being made and the unit should be ready to run in a day or two. Mr. Silverstein inquired as to what investigations had been made concerning the effect of vibration on the building and equipment. The possibility of damage from the vibration set up by the unit and the fire hazard were discussed by the group. Mr. Pinkel said that he would look into the problem and discuss it with the Accident Investigation Committee.

Mr. Pinkel stated that it was planned to measure thrust, airflow, temperature at the inlet, fuel flow, total heat at the inlet, static pressure in the surge tank, average total pressure ahead of grid, and pressure variation by means of piezo electric pick-up. Motion pictures will be taken of the exhaust flame and consideration is being given to using a maximum pressure gage. It

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was stated that limited instrumentation was being used to reduce the required running time to a minimum.

Mr. Silverstein suggested that the fire department be notified when the tests were ready to start.

Mr. Silverstein stated that a new unit and two spare grills which were intended for tests in the Altitude Wind Tunnel (tests cancelled) will be available soon.

Mr. Bressman showed drawings of a valve intended for tests in a grill made up to fit the Ford unit. The valve is approximately four times the size of the German valve. Mr. Bressman stated that the hinged-type valve will be ready for tests in the reciprocating piston apparatus in about a week. The hinged valve will be made of .015-inch Swedish-blue steel stock.

After discussion by the group it was agreed that the hinged-valve design be incorporated in a grill to fit the Ford-built unit would be the first modification to be tried. Mr. Pinkel stated that the equipment will be ready for installation of the new grill in about three weeks.

Mr. Bressman stated that the valve would be ready in about one week and that it would take approximately three additional days to draw up the design for the German unit. To expedite the modification it was agreed to proceed with drawing up the best design for use in the German unit based on current knowledge and modify the design, if necessary, as a result of the tests in the reciprocating piston apparatus before construction is actually started.

Mr. Burgess showed a drawing of a small-scale unit using a smaller valve with a combustion chamber for the purpose of testing the valve under combustion conditions.

Mr. Pinkel stated that the current aero-pulse project is really a development job and on this basis the proposal of Mr. Burgess would be out of line in that it is essentially research equipment.

Mr. Pinkel stated that it was his opinion that the combustion problem involved in the design would be a difficult one. He agreed that close simulation to the actual operation as would be obtained with the unit was very desirable but that results would only be qualitative from the combustion standpoint.

In view of the fact that consideration of Mr. Burgess's proposal hinged on how deep the NACA intended to go into research on aero-pulse unit, this question was discussed by the group. Since the results of modifications made on the Ford-built unit would probably be a determining factor it was decided to table the proposal pending test results on the Ford-built unit.

Mr. Bressman reviewed the design of the NACA aero-pulse unit which is 14 feet long, has a combustion area to tailpipe area ratio of 4, and is intended to operate at 55 cycles per second. The fuel supply system designed

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for the unit incorporates an interrupter mechanism for controlling fuel injection. The interrupter mechanism has a lapped fit on the rotor for sealing. Mr. Pinkal suggested that a simpler system might be arrived at.

Mr. Rothrock stated that from his experience he didn't see how the interrupter could be anything but expensive. He suggested that a member of the group discuss the problem with Cleveland Diesel and other manufacturers of Diesel fuel pumps.

Mr. Schey suggested that manufacturers of hydraulic equipment might be of some assistance. Mr. Bressman said that he would discuss the problem with local manufacturers as suggested. Approval of the suggested system will be made when additional information on construction of the interrupter mechanism is available.

Mr. Bressman stated that 19 fuel injection valves were incorporated in the grill for fuel injection and that the nozzles were pointed upstream. Four spark plugs would be used for ignition.

Mr. Bressman stated that in the valve design the free-flow area in the grill was 45% of the total area as compared to 32% for the unit built by the Ford Motor Company.

Meeting adjourned at 12:15.

Jesse H. Hall,  
Secretary, Ram Jet Committee.

JHH:ink

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RAM JET CONFERENCE

February 13, 1945.

The Committee met in the Executive Conference Room at Cleveland on February 13, 1945 at 2:00 p.m. Present:

Abel Silverstein, Chairman

O. W. Schey

B. Pinkel

A. M. Rothrock

J. H. Hall, Secretary

The minutes of the previous meeting were read and approved as read.

The Chairman stated that there was increasing interest in the ram-jet type propulsion unit with the guided missile program. It was noted by the Chairman that Colonel Wassel had suggested the use of the term "pilotless aircraft" instead of guided missile.

A review of progress accomplished since the last meeting of the committee by the committee members was requested. Mr. Pinkel stated that tests of the Ford-built intermittent-flow ram jet had been made with ram pressures from 0 to 20" of water at various fuel-air ratios. Data from these tests had been turned over to the computers and the results will probably be available before the end of the meeting.

Mr. Pinkel stated that examination of the motion pictures of the exhaust showed flames issuing from the tailpipe for 30% of the cycle and the flame appears to be sucked back at the completion of burning. It was noted that the flame shape differed from cycle to cycle. Mr. Rothrock stated that Colonel Wassel had mentioned variation in the cycles observed in motion pictures taken at Wright Field. The Chairman stated that an intermittent-flow ram jet twice the size of the Ford-built unit had been constructed at Wright Field. This unit developed a thrust of 1900 pounds with lower fuel consumption than with the smaller unit but resulted in a number of broken windows.

Mr. Pinkel stated that the Army was interested in using two of the Ford-built units on the P-51 to increase the speed of that airplane. Of the means being considered are the use of auxiliary rocket and the use of nitrous oxide for increased engine power. Mr. Pinkel stated that the "single-shot" combustion unit had been made to cycle and motion pictures of the flame had been taken. The chairman inquired as to what advantages would be obtained from controlled ignition. Mr. Pinkel stated that controlled ignition would make each cycle independent and should result in an increase of maximum pressure. The motion pictures showed flames starting at the spark and moving along with the flow until the first flame sphere reaches the nozzle at which time the flame front moved upstream to complete the burning of the charge. Three ignition points per cycle were indicated.

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